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ABSTRACT

This guide outlines a program to familiarize elementary students with microcomputer operations, the widespread use of computers, and the computer's capabilities and limitations. The first section presents objectives, learning activities, and evaluation methods for six content areas: (1) What is a computer? (2) How do computers work? (3) Student interaction with computers, (4) Beginning programing (BASIC), (5) Everyday computers, and (6) History of computers. The level at which each objective is introduced, developed, mastered, and reviewed is indicated. A section on implementing and utilizing the microcomputer in the elementary classroom outlines procedures for training and scheduling students to operate the computer, and provides study sheets and tests for operator certification. A detailed, illustrated manual explains specific operation procedures for using the Apple II microcomputer.. Additional materials provided include a teacher survey form, software selection information (criteria, evaluation forms, and selected sources), guidelines for organizing a student computer club and special projects, and two annotated bibliographies. The script for a sound filmstrip designed to introduce students and teachers to the computer, teaching suggestions, and the answer key for the related student workbook of activities and ideas are included. (LMM)

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ELEMENTARY COMPUTER LITERACY

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INTRODUCTION

The following K-6 computer literacy curriculum has been developed by the Elementary Media Specialists: Ruth Sather, Longfellow School, Eau Claire School System, Betty Dahl, Pedersen Elementary, Altoona School System and Lynn Schulz, Augusta Elementary, Augusta School System.

The philosophy and goals of the curriculum are that the students in grades K-6 will have an opportunity to become familiar with the operation of the microcomputer, become aware of the widespread use of computers in the world around them and that they will be aware of both the computer's capabilities and limitations. It is intended that the program be correlated with the classroom studies.

CONTENT AREAS

I. WHAT IS A COMPUTER?

II. HOW DO COMPUTERS WORK?

III. STUDENT INTERACTION WITH COMPUTERS

IV. BEGINNING PROGRAMMING

V. EVERYDAY COMPUTERS

VI. HISTORY OF COMPUTERS

Each content area includes objectives, learning activities and means of evaluation where appropriate. Indication is given for the level where each objective is introduced (I), developed, (D), mastered (M) and reviewed (R).

CURRICULUM GUIDE

by

RUTH A. SATHER

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SCOPE AND SEQUENCE

COMPUTER LITERACY OBJECTIVES

	K	1	2	3	4	5	6
I. WHAT IS A COMPUTER?							
1. Students will become familiar with the computer by observing prepared programs during class sessions.	I	D	D	D	D	D	D
2. Students will develop a positive attitude toward computers.	I	D	D	D	D	D	D
3. Students will be able to describe in their own words what a computer is.	I	D	M	R	R	R	R
4. Students will be able to identify a video monitor, terminal, disk drive, and printer as the major components of a computer system.		I	D/M	R	R	R	R
5. Students will be able to list speed, accuracy, and memory as characteristics of the computer.			I	D/M	R	R	R
6. Students will be able to describe various functions a computer can perform.		I	D	D	M	R	R
7. Students will be able to describe various functions a computer cannot perform.		I	D	D	M	R	R
8. Students will be able to list some advantages and disadvantages of computers.				I/D	D	M	R

	K	1	2	3	4	5	6
II. HOW DO COMPUTERS WORK? 9. Students will become familiar with general computer terms.	I	D	D	D	D	D	D
10. Students will be able to define and use general computer terminology.				I/D	D	M	R
11. Students will be able to distinguish between hardware and software.		I	D	M	R	R	R
12. Students will be able to describe the basic components of computer hardware.			I	D/M	R	R	R
13. Students will be able to explain the steps that a computer goes through in handling data (input, processing, memory, and output).				I	D	D	M
14. Students will be exposed to the two levels of memory used by computers, i.e., RAM, ROM.					I	D	D
15. Students will be able to explain the relationship between input, process, and output.					I	D	D/M
16. Students will become familiar with the computer keyboard.	I	D	D	D	D	D	D
17. Students will be able to explain the function of various keys.	I	D	D	D	D	D	D/M

	K	1	2	3	4	5	6
III. STUDENT INTERACTION WITH COMPUTERS 18. Students will exhibit the proper care of computer hardware and software.	I	D	D	M	R	R	R
19. Students will be able to demonstrate how to correctly operate the computer.	I	D	D	M	R	R	R
20. Students will show confidence in operating prepared programs.			I/D	M	R	R	R
21. Students will be able to use prepared drill and practice programs to reinforce their knowledge in math and language arts.	I	D	M	R	R	R	R
22. Students will be able to use prepared simulation programs to reinforce social studies and science concepts.				I/D	M	R	R
23. Students will be able to use prepared tutorials for basic instruction in a given curricular area.				I/D	M	R	R
24. Students will be able to distinguish between drill and practice, simulation, and tutorial programs.				I/D	M	R	R

	K	1	2	3	4	5	6
IV. BEGINNING PROGRAMMING 25. Students will be able to recognize that we communicate with a computer through a special language.		I	D	D	M	R	R
26. Students will be able to list several computer languages.				I	D	D	M
27. Students will be able to list some programming commands.					I	D	D
28. Students will be aware that programming can be used to solve problems.					I	D	D
29. Students will be introduced to flowcharting.					I	D	D
30. Students will be able to draw a simple flowchart.					I/D	D	M
31. Students will be able to write a program for a specific task.					I	D	D
V. EVERYDAY COMPUTERS 32. Students will be aware of the impact of computers on everyday life -- present and future.	I	D	D	D	D	D	D
33. Students will be able to describe several ways computers are used in everyday life.	I	D	D	D	M	R	R
34. Students will be shown how computers are used in business, education, law enforcement, medicine as well as by individuals.			I	D	D	D	D

	K	1	2	3	4	5	6
35. Students will be introduced to career opportunities associated with computers.	I	D	D	D	D	D	D
36. Students will explain where computers are used in our community and for what purpose.			I	D	M	R	R
VI. HISTORY OF THE COMPUTER 37. Students will become aware of various early computing devices.	I	D	D	M	R	R	R
38. Students will be able to describe the historical development of computers.					I	D	D
39. Students will be aware of the four generations of computers, i.e. vacuum tubes, transistors, integrated circuits, microprocessing (chip).						I	D

I. WHAT IS A COMPUTER?

1. STUDENTS WILL BECOME FAMILIAR WITH THE COMPUTER BY OBSERVING PREPARED PROGRAMS DURING CLASS SESSIONS.

Learning Activities

Use a quality prepared program for class demonstration

Use Elementary Volume 7 diskette (MECC) to demonstrate a prepared program in grades K-2.

Use Elementary Volume 4 diskette (MECC) to demonstrate a prepared program in grades 3-6.

Reference

Elementary Computer Literacy Student Handbook p. 2-3

IMC Microcomputer Software Catalog

2. **STUDENTS WILL DEVELOP A POSITIVE ATTITUDE TOWARD COMPUTERS.**

Learning Activities

Use a variety of diskettes which allow student interaction with the computer.

Read Katie and the Computer.

Show SFS No. 1 from **Computer Awareness Kit.**
Elementary Computer Literacy Student Handbook p. 4-5
Reference

3. **STUDENTS WILL BE ABLE TO DESCRIBE IN THEIR OWN WORDS WHAT A COMPUTER IS.**

Learning Activities

Read My Friend the Computer, pp. 11-18.

Read What Is A Computer? -- Part I.

Read Computers For Kids -- Section 1.

Read Be A Computer Literate -- Chapter 2.

Draw what a computer looks like. - Student Handbook p. 2-3

Write a computer story. - Student Handbook p. 7

Write a computer poem. - Student Handbook p. 6

Make a computer bulletin board. - Student Handbook p. 61-65
Elementary Computer Literacy Student Handbook p. 6-7

References

My Friend the Computer (Teacher's Guide)
Computers Are Fun (Activity Guide)

4. **STUDENTS WILL BE ABLE TO IDENTIFY A VIDEO MONITOR, TERMINAL, DISK DRIVE, AND PRINTER AS THE MAJOR COMPONENTS OF A COMPUTER SYSTEM.**

Learning Activities

Read Katie and the Computer.

Read Computers Are Fun – Chapter 3.

Construct a bulletin board displaying the four components of a computer system. Student Handbook p. 8

Use Computer Tutor, p. 19.

Reference

Computers Are Fun (Teacher's Guide)

5. **STUDENTS WILL BE ABLE TO LIST SPEED, ACCURACY, AND MEMORY AS CHARACTERISTICS OF THE COMPUTER.**

Learning Activities

Use SFS #1 from Computer Awareness Kit.

Use the Apple Demo diskette.

Read Be A Computer Literate -- Chapter 2.

Elementary Computer Literacy - Student Handbook p. 9

Reference

My Friend the Computer -- Part I

6. **STUDENTS WILL BE ABLE TO DESCRIBE VARIOUS FUNCTIONS A COMPUTER CAN PERFORM.**

Learning Activities

Use SFS #1 from Computer Awareness Kit.

Use Skillboosters 1 and 5 from Computer Awareness Kit.

Use Computer Tutor to construct a bulletin board, p. 6.

Use Computer Tutor Worksheets 9 and 10.

Read A New True Book of Computers, pp. 5-7.

Elementary Computer Literacy - Student Handbook p. 9

Reference

7. **STUDENTS WILL BE ABLE TO DESCRIBE FUNCTIONS A COMPUTER CANNOT PERFORM.**

Learning Activities

Use SFS #1 from **Computer Awareness Kit.**

Use Skillboosters 1 and 5 from **Computer Awareness Kit.**

Use **Computer Tutor** to construct a bulletin board, p. 6.

Use **Computer Tutor** Worksheet, p. 10.

Read **A New True Book of Computers**, pp. 5-7.

Elementary Computer Literacy - Student Handbook p. 10

Reference

8. **STUDENTS WILL BE ABLE TO LIST SOME ADVANTAGES AND DISADVANTAGES OF COMPUTERS.**

Learning Activities

Use SFS #1 from **Computer Awareness Kit** – discuss advantages and disadvantages.

Use Skillbooster #6 from **Computer Awareness Kit.**

Read **Exploring With Computers**, p. 58.

Elementary Computer Literacy - Student Handbook p. 10

Reference

II. **HOW DO COMPUTERS WORK?**

9. **STUDENTS WILL BECOME FAMILIAR WITH GENERAL COMPUTER TERMINOLOGY.**

Learning Activities

Read Katie and the Computer.

Use Skillbooster #4 from Computer Awareness Kit.

Read Computer Alphabet Book.

Read Exploring With Computers.

Use SFS #1, Computer Awareness Kit.
Elementary Computer Literacy - Student Handbook p. 13-17

References

My Computer Picture Dictionary
Computer Dictionary for Everyone

10. **STUDENTS WILL BE ABLE TO DEFINE AND USE GENERAL COMPUTER TERMINOLOGY.**

Learning Activities

Use Computer Tutor 7 and 8.

Use Computer Study Sheets 1 and 2, Computer Vocabulary Test #1 by Sather. - Implementation Manual

Use Ditto Masters 1a-1f, My Friend the Computer (Teacher's Guide).

Use Ditto Masters L, M, N, O, Computers Are Fun.

Use "Computer Literacy Glossary" from **Computer Awareness Kit.**

Use Diskette 1 and Skillboosters 10 and 12 from Computer Awareness Kit.
Elementary Computer Literacy - Student Handbook p. 18-20

References

Computers Are Fun (Teacher's Guide)
My Computer Picture Dictionary
Computer Dictionary for Everyone
Be A Computer Literate

11. **STUDENTS WILL BE ABLE TO DISTINGUISH BETWEEN HARDWARE AND SOFTWARE.**

Learning Activities

Use **Computer Tutor** 18 and 19.

Read **What Is A Computer?** – Part 4.

Use Skillbooster #9 and SFS #2, **Computer Awareness Kit.**

Use class demonstration of hardware and software in your school.

Bulletin board/poster display of computer hardware and software.

Read **My Friend the Computer** – Part 6.

Read **Exploring With Computers**, p. 33.

Elementary Computer Literacy - Student Handbook p. 21

References

Computer Alphabet Book
Introduction to Computers in Education for Elementary and Middle School Teachers

12. **STUDENTS WILL BE ABLE TO DESCRIBE THE BASIC COMPONENTS OF COMPUTER HARDWARE.**

Learning Activities

Use **Computer Tutor** 19.

Use SFS #2 and Skillbooster #9 from **Computer Awareness.**

Use hardware in your school for demonstration purposes.

Read **Exploring With Computers**, p. 33.

Read **What Is A Computer? – Part 4.**

Role-playing situation having students portray components of computer hardware.

Reference

Introduction to Computers in Education for Elementary and Middle School Teachers

13. **STUDENTS WILL BE ABLE TO EXPLAIN THE STEPS THAT A COMPUTER GOES THROUGH IN HANDLING DATA (INPUT, PROCESSING, MEMORY, AND OUTPUT).**

Learning Activities

Read My Friend The Computer, Part 4.

Use Ditto Masters 12, 13, and 38.

Use Computer Tutor 16 and 17.

Use SFS #2 and Diskette 2, Computer Awareness Kit, Skillbooster #7.

Read What Is A Computer? -- Part 3.

Read Be A Computer Literate -- Chapter 3.

Read Exploring With Computers, pp. 22-32.

Read A Young Math Book -- Computers, pp. 14-19.

Read Katie and the Computer.

SFS #2 Computers from Pebbles to Computers.
Elementary Computer Literacy - Student Handbook p. 22-23

References

Introduction to Computers in Education for Elementary and Middle School Teachers

My Friend the Computer (Teacher's Guide)

14. **STUDENTS WILL BE EXPOSED TO THE TWO LEVELS OF MEMORY USED BY COMPUTERS, I.E. RAM, ROM.**

Learning Activities

Read Katie and the Computer.

SFS #2 and Skillbooster #8, Computer Awareness Kit.
Elementary Computer Literacy - Student Handbook p. 24
Reference

15. **STUDENTS WILL BE ABLE TO EXPLAIN THE RELATIONSHIP BETWEEN INPUT, PROCESS, AND OUTPUT.**

Learning Activities

Use SFS #2, **Computer Awareness Kit.**

Use Computer Tutor 17.

Read **What Is A Computer?** — Part 3.

Read **Be A Computer Literate** — Chapter 3.

Use Diskette, **Simulated Computer.**

Elementary Computer Literacy - Student Handbook p. 22-23

Reference

My Friend the Computer (Teacher's Guide)

16. **STUDENTS WILL BECOME FAMILIAR WITH THE COMPUTER KEYBOARD.**

Learning Activities

Use Ditto Master 31, **My Friend the Computer.**

Use Ditto Master P, **Computers Are Fun.**

Use Diskette, **Master Type.**

Use Computer Manual by Sather, p. 19 - Implementation Manual

Make flip charts of the keyboard.

Use a typewriter to demonstrate similarity
to computer keyboard.
Elementary Computer Literacy - Student Handbook p. 25-26
Typing Fun — activity book.

Group Activity: Students make keys (individual) which will be assembled on a bulletin board to illustrate the keyboard.

References

My Friend the Computer (Teacher's Guide)
IMC Microcomputer Software Catalog

17. **STUDENTS WILL BE ABLE TO EXPLAIN THE FUNCTION OF VARIOUS KEYS.**

Learning Activities

Use Diskette 1, Computer Awareness Kit.

Activity card "Getting Started," Meet the Computer.

Appendix A, My Friend the Computer.

Flash cards of keys (teacher-made). - **Elelementary Computer Literacy** - Student Handbook p. 29-30
Elementary Computer Literacy - Student Handbook p. 27-28
Reference

II. HOW A COMPUTER WORKS.

Evaluation devices correlated with computer literacy objectives 9-17.

9. Informal discussion with students about computers.

10. Student will be given a written test on computer terminology and correctly use the terms when working with the computer.

11. Given samples of hardware and software, the student will correctly identify as one or the other and explain why.

12. Given a list of basic components of computer hardware, the student will be able to verbally describe them in his or her own words.

13. Using a specific problem such as performing addition, the student will be able to describe, on paper, how the computer handles data. If correctly described, it will contain input, processing, memory and output.

15. Student will draw a diagram showing how input, processing and output are related.

16. Observe how quickly the student can locate the keys to type his or her entire name.

17. Given a list of commonly used keys, the student will write an explanation of their functions.

Elementary Computer Literacy - Student Handbook p. 31-32

III. STUDENT INTERACTION WITH COMPUTERS

18. STUDENTS WILL EXHIBIT THE PROPER CARE OF COMPUTER HARDWARE AND SOFTWARE.

Learning Activities

Demonstration of proper care of hardware and software.

Use Computer Manual by Sather - Implementation Guide p. 18

Reference

Applesoft Tutorial

19. **STUDENTS WILL BE ABLE TO DEMONSTRATE HOW TO CORRECTLY OPERATE THE COMPUTER.**

Learning Activities

Use Computer Study Sheet #2 by Sather, Implementation Manual p. 10

Take Computer Operation Test by Sather - Implementation Manual p. 13

Individual check-off by Media Specialist or student assistants.

Use Ditto Master 28, **My Friend the Computer.**

Receive Operator's License. - Implementation Manual p. 27

Elementary Computer Literacy - Student Handbook p. 34-36

Reference

20. STUDENTS WILL SHOW CONFIDENCE IN OPERATING PREPARED PROGRAMS.

Learning Activities

Monitor students using prepared programs.

Students will come to the Computer Center to use the computer.

Licensed students will act as tutors.

Reference

21. **STUDENTS WILL BE ABLE TO USE PREPARED DRILL AND PRACTICE PROGRAMS TO REINFORCE THEIR KNOWLEDGE IN MATH AND LANGUAGE ARTS.**

Learning Activities

Demonstrate a drill and practice program with: Elementary Volume 1 (MECC) — i.e., Speed Drill (Math), Elementary Volume 5 (MECC), and Prefixes (Language Arts).

Locate and use diskettes in Computer Center of drill and practice as a reinforcement of classroom activities.

References

IMC Microcomputer Software Catalog

(MECC) Support Booklets

22. **STUDENTS WILL BE ABLE TO USE PREPARED SIMULATION PROGRAMS TO REINFORCE SOCIAL STUDIES AND SCIENCE CONCEPTS.**

Learning Activities

Demonstrate simulation program with:
Elementary Volume 6 (MECC) — i.e., Oregon Trail (Social Studies).

Demonstrate simulation on program with:
Elementary Volume 3 (MECC) — i.e., Odell Lake (Science).

Locate and use diskettes in Computer Center of simulations as a reinforcement of classroom activities.

Reference

IMC Microcomputer Software Catalog

(MECC) Support Booklets

23. **STUDENTS WILL BE ABLE TO USE PREPARED TUTORIALS FOR BASIC INSTRUCTION IN A GIVEN CURRICULAR AREA.**

Learning Activities

Demonstrate tutorial program with Hartley — Disk 2, i.e., clock.

Demonstrate tutorial program with Compu-Math-Decimals.

Locate and use diskettes in Computer Center of tutorial programs.

References

IMC Microcomputer Software Catalog

(MECC) Support Booklets

24. **STUDENTS WILL BE ABLE TO DISTINGUISH BETWEEN DRILL AND PRACTICE, SIMULATION AND TUTORIAL PROGRAMS.**

Learning Activities

Use Apple DEMO to show students the difference between drill and practice, simulation and tutorial programs.

Run random displays of drill and practice, simulation, tutorial programs and have students determine type of CAI.

References

ZMC Microcomputer Software Catalog

(MECC) Support Booklets

IV. BEGINNING PROGRAMMING

25. STUDENTS WILL BE ABLE TO RECOGNIZE THAT WE COMMUNICATE WITH A COMPUTER THROUGH A SPECIAL LANGUAGE.

Learning Activities

Read A New True Book Computers, pp. 35-38.

Read Computers Are Fun — Chapter 6.

Read Computer Alphabet Book — "Language."

Read Be A Computer Literate — Chapter 6.

Elementary Computer Literacy - Student Handbook p. 38

Reference

26. STUDENTS WILL BE ABLE TO LIST SEVERAL COMPUTER LANGUAGES.

Learning Activities

Use SFS #4 and Diskette 4 from Computer Awareness Kit.

Read My Friend the Computer — Part 7.

Elementary Computer Literacy - Student Handbook p. 38

Reference

27. **STUDENTS WILL BE ABLE TO LIST SOME PROGRAMMING COMMANDS.**

Learning Activities

Use SFS #4 and diskette from Computer Awareness Kit.

Use Skillboosters 22 and 24 from Computer Awareness Kit.

Use Computers for Kids — Sections 6 and 12.

Read Be A Computer Literate — Chapter 7.

Read 1 Computer, 30 Kids.

Elementary Computer Literacy - Student Handbook p. 40

Reference

28. STUDENTS WILL BE AWARE THAT PROGRAMMING CAN BE USED TO SOLVE PROBLEMS.

Learning Activities

Read Be A Computer Literate — Chapter 7.

Use SFS #4 from Computer Awareness Kit.

Read A Young Math Book — Computers, pp. 10-19.

Read Meet the Computer, pp. 41-45.

Read A New True Book Computers, pp. 35-38.

Use Meet the Computer — Activity Cards "What is a program."

Read My Friend the Computer — Chapter 7 and use Ditto Master 21.

Reference

29. STUDENTS WILL BE INTRODUCED TO FLOWCHARTING.

Learning Activities

Read Computers for Kids — Section 2.

Read My Friend the Computer — Part 6.
and use Duplicating Masters 16 and 17.

Read A Young Math Book Computers, pp. 20-25.

Read Be A Computer Literate — Chapter 5.

Read What Is A Computer? — pp. 59-69.

Use SFS #4 and diskette from **Computer Awareness Kit.**

Use Skillboosters 19, 20, and 21 from **Computer Awareness Kit.**

Read Computers Are Fun — Chapter 5 and
use Ditto Masters R and S.

Use Computer Tutor — 40.

Elementary Computer Literacy - Student Handbook p. 41-47

References

My Friend the Computer (Teacher's Guide)

Computers Are Fun (Teacher's Guide)

30. **STUDENTS WILL BE ABLE TO DRAW A SIMPLE FLOWCHART.**

Learning Activities

Read **Computers for Kids** — Section 2.

Read **Exploring With Computers**, pp. 45-51.

Use **Computer Tutor** 29 and 30.

Read **Computers Are Fun** — Chapter 5 and
use Ditto Masters T, U, and V.

Read **My Friend the Computer** — Part 6
and use Ditto Masters 18 and 19.

Construct a group flowchart for a bulletin board. - **Elementary Computer Literacy** - Student Handbook p. 63
Elementary Computer Literacy - Student Handbook p. 43-45

References

My Friend the Computer (Teacher's Guide)

Computers Are Fun (Teacher's Guide)

31. **STUDENTS WILL BE ABLE TO WRITE A PROGRAM FOR A SPECIFIC TASK.**

Learning Activities

Read Be A Computer Literate — Chapter 7.

Use Computer Tutor 32-34.

Read My Friend the Computer — Chapter 7 and use Ditto Master 22.

Use Ditto Masters in Computers Are Fun — y1 and y2.

Use Meet the Computer Activity Cards "Beginning to Advance."
Elementary Computer Literacy - Student Handbook p. 46-49
Reference

Computers Are Fun (Teacher's Guide)

V. EVERYDAY COMPUTERS

32. STUDENTS WILL BE AWARE OF THE IMPACT OF COMPUTERS ON EVERYDAY LIFE — PRESENT AND FUTURE.

Learning Activities

Read Computers in Your Life.

Use SFS #3 Diskette 3 from Computer Awareness Kit.

Use Skillboosters 14 and 17 from Computer Awareness Kit.

Read A New True Book Computers, pp. 39-45.

Read Be A Computer Literate — Chapter 8.

Read Computer Tutor 9 and 15.

Read Computers Are Fun — Chapter 1 and use Ditto Master C.

Use Ditto Masters 7 and 8 from My Friend the Computer.

Read Meet the Computer, pp. 8-20.

Read Exploring With Computers, pp. 43-44.
Elementary Computer Literacy - Student Handbook p. 51-52
Reference

33. STUDENTS WILL BE ABLE TO DESCRIBE SEVERAL WAYS COMPUTERS ARE USED IN EVERYDAY LIFE.

Learning Activities

Use SFS #3 Diskette 3 from Computer Awareness Kit.

Read A New True Book Computers, pp. 39-45.

Use Skillboosters 13, 15, and 18 from Computer Awareness Kit.

Read Meet the Computer, pp. 8-20.

SFS #3 Computers, from Pebbles to Program.

Elementary Computer Literacy - Student Handbook p. 54

Reference

34. **STUDENTS WILL BE SHOWN HOW COMPUTERS ARE USED IN BUSINESS, EDUCATION, LAW ENFORCEMENT, MEDICINE AS WELL AS BY INDIVIDUALS.**

Learning Activities

Read Careers in Computers.

Read A New True Book Computers, pp. 39-45.

Read Be A Computer Literate — Chapter 8.

Read My Friend the Computer — Part 2.

Use SFS #3 and Diskette 3 from Computer Awareness Kit.
Elementary Computer Literacy - Student Handbook p. 53
Reference

33. **STUDENTS WILL BE ABLE TO DESCRIBE SEVERAL WAYS COMPUTERS ARE USED IN EVERYDAY LIFE.**

Learning Activities

Use SFS #3 Diskette 3 from Computer Awareness Kit.

Read A New True Book Computers, pp. 39-45.

Use Skillboosters 13, 15, and 18 from Computer Awareness Kit.

Read Meet the Computer, pp. 8-20.

SFS #3 Computers, from Pebbles to Program.

Elementary Computer Literacy - Student Handbook p. 54

Reference

34. **STUDENTS WILL BE SHOWN HOW COMPUTERS ARE USED IN BUSINESS, EDUCATION, LAW ENFORCEMENT, MEDICINE AS WELL AS BY INDIVIDUALS.**

Learning Activities

Read Careers in Computers.

Read A New True Book Computers, pp. 39-45.

Read Be A Computer Literate — Chapter 8.

Read My Friend the Computer — Part 2.

Use SFS #3 and Diskette 3 from Computer Awareness Kit.
Elementary Computer Literacy - Student Handbook p. 53

Reference

35. **STUDENTS WILL BE INTRODUCED TO CAREER OPPORTUNITIES ASSOCIATED WITH COMPUTERS.**

Learning Activities

Use SFS #3 and Diskette 3 from **Computer Awareness Kit.**

Use Skillboosters 16 and 23 from **Computer Awareness Kit.**

Read **I Want To Be A Computer Operator.**

Read **What Can She Be? A Computer Scientist.**

Read **Careers in Computers.**

Read **A Young Math Book Computers** 30-31.

Use Ditto Masters 5 and 6 from **My Friend the Computer.**

Read **Exploring With Computers,** pp. 42-43.

Resource People.

Use **Computer Tutor** 44 and 45.
Elementary Computer Literacy - Student Handbook p. 55-56
Reference

36. STUDENTS WILL EXPLAIN WHERE COMPUTERS ARE USED IN OUR COMMUNITY AND FOR WHAT PURPOSE.

Learning Activities

Brainstorming to discover where and how computers are used in the community — follow-up: Community field trips.

Community resource people.

Collect articles on computers in your community. Compile a scrapbook or bulletin board. **Elementary Computer Literacy** - Student Handbook p. 64

Reference

VI. HISTORY OF THE COMPUTER

37. STUDENTS WILL BECOME AWARE OF VARIOUS EARLY COMPUTING DEVICES.

Learning Activities

Read A New True Book Computers, pp. 12-16.

Read Computers Are Fun — Chapter 2.

Read My Friend the Computer — Part 3.

Read Computers.

SFS #1 Computers, From Pebbles to Programs.
Elementary Computer Literacy - Student Handbook p. 58-59
Reference

General Encyclopedias

38. **STUDENTS WILL BE ABLE TO DESCRIBE THE HISTORICAL DEVELOPMENT OF COMPUTERS.**

Learning Activities

Use Skillbooster #7 from **Computer Awareness Kit.**

Read **A New True Book Computers**, pp. 8-27.

Read **What Is A Computer? — Part 2.**

Read **My Friend the Computer — Part 3** and use Duplicating Masters 10, 36 and 37.

Use **Computer Tutor** Worksheets 11-14.

Read **Computers Are Fun — Chapter 2.**

Use **Computers Are Fun** Worksheets H, I, and J.

Read **Exploring With Computers**, 12-21.

SFS #1 & 2 **Computers, From Pebbles to Programs.**

Elementary Computer Literacy - Student Handbook p. 58-59

References

My Friend the Computer (Teacher's Guide)

General Encyclopedias

39. STUDENTS WILL BE AWARE OF THE GENERATIONS OF COMPUTERS, I.E. VACUUM TUBES, TRANSISTORS, INTEGRATED CIRCUITS, MICROPROCESSING (CHIP).

Learning Activities

Read What Is A Computer? — Part 2.

Read My Computer Picture Dictionary.

Read My Friend the Computer — Part 3
and use Duplicating Master 10.

SFS #2 Computer, From Pebbles to Programs.

Elementary Computer Literacy - Student Handbook p. 59

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General Encyclopedias

My Friend the Computer (Teacher's Guide)

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White Plains, NY 10602

IMPLEMENTING AND UTILIZING THE MICROCOMPUTER IN THE ELEMENTARY SCHOOL

By

Ruth A. Sather

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INTRODUCTION

In this era of technology, those of us in the media field are rapidly becoming aware of the crucial role computers play in our everyday lives. The ability to use the computer promises to be as basic and necessary to a person's education as learning to read, to write and to solve mathematical problems. As microcomputers are fast becoming common place in the elementary school, there is a need to establish procedures for their implementation and utilization. To utilize the microcomputer in the elementary school to its fullest extent, for the benefit of most students, it is necessary to identify curriculum areas and grade levels where drill and practice, problem solving, simulation and tutorial activities would be applicable. It is also necessary to identify specific software available which can be used to enhance learning in the existing subject areas and units of work. Furthermore, there is a need to determine what computer literacy activities would be appropriate for different grade levels. Finally, it is necessary to determine how student computer instruction and use could be scheduled and what procedures would be used for teacher inservice. Thus, the following plan was developed and expanded for implementing and utilizing the microcomputer to make students and teachers knowledgeable computer users.

CHAPTER I

PROCEDURE FOR LEARNING COMPUTER OPERATION

Students

With only one microcomputer for 325 students, this task was not an easy one. Almost all students were eager and were constantly asking, "When can I use the computer?" To efficiently and effectively handle the activities of training and scheduling the students, the following plan was developed.

Prior to the purchasing of the microcomputer, which was funded by the Parent Teacher Association, the gifted and talented students had a unit of approximately ten sessions about computers. The unit included the following topics:

1. What a computer is.
2. How computers are used.
3. History of computers.
4. How a computer works.
5. How to get input and output out of a computer.
6. How to do flowcharting.
7. How to write simple programs.

During the unit, the students had a field trip to the computing center at the University of Wisconsin-Eau Claire, saw films about computers, and wrote to various computer manufacturers. These students became the first computer literates in the school.

In order for the elementary students to operate the computer and run programs, a structured learning procedure was established for the students to follow. Students, starting with the gifted and talented followed by the sixth grade, had a half hour group demonstration and were given independent study sheets on terminology and operation. From that point, it was an individual choice of the student to earn the right to use the computer.

First, the student had to familiarize her/himself with the independent study sheets (pp. 8-11) and then see the media specialist for written tests (pp. 12-13) in both areas. If successful, the student then demonstrated competency in operating the computer. If met with approval, the student became a licensed operator. Students were reminded that misuse or abuse of the computer would result in having the license revoked for a period of time.

After the majority of sixth grade students became licensed, the fifth grade students went through the same procedure and likewise the fourth grade. As a licensed operator, the student was put on a half hour weekly schedule (p. 14) agreed upon between the teacher and the media specialist. The teacher was able to prescribe the kind of programs that the student was to work on by selecting titles from the catalog of software housed in the Media Center. These programs could range from the metric system, Civil War, Oregon, prefixes, math drill to earthquakes.

As more and more students became licensed, the schedule needed to be revised. The students who had the most computer time logged were put on an open schedule where they could use the computer during available time slots or before school, during recess or after school. Primary students use of the computer was usually done on a group basis, using drill and practice for mathematics, tutorial for spelling and simulations for science. The learning disabilities teacher used the computer with his students for individualized spelling and math. By having an organized and established procedure, students did not have to wait to use the computer. They were anxious and proud to receive their license and eagerly looked forward to their scheduled times.

With the addition of two microcomputers and an increased enrollment of 200 students, further changes had to be made to accommodate students. New students in grades four through six were given the orientation program, and after passing the written tests, they were put on a time schedule with a licensed student. The licensed student then became the instructor for the new user.

The third grade students were the next to receive orientation and instruction. They were given a modified version of the test. Within a two week time period, approximately 90 third graders received their license. It then became necessary to reserve one computer for primary students and two for intermediate grade students. Second grade students were put on a weekly schedule to use the computer in groups of two or three. A student from the computer club was scheduled at the same time so they could assist with the mechanics of operating the computer. First grade and kindergarten classes used the computer on a group basis as part of media instruction. By the end of the year, nearly all of the 525 students had some computer experience.

Teachers

Teacher inservice is usually a little more difficult to approach than students'. It was necessary to devise a system that would attract them to the media center for orientation to the microcomputer.

It was arranged that teachers would be invited to come to the media center on a designated day over their lunch hour. They were asked to bring a sack lunch or gourmet from the cafeteria. Dessert and coffee would be furnished (this will usually tempt them). During this time they were given a demonstration on how to operate the computer and run programs. A program was run to show the various features of the computer such as accuracy, speed, color, graphics and sound. The teachers had a chance to run some of the same programs their students were using. One program in particular, was the Oregon Trail. This is a historical simulation in which much decision making is required. Excitement mounted, just as the students' did, when a wrong decision was made and they almost died on the Oregon Trail. With this taste of microcomputers they were anxious to come back for more.

Majority of faculty members came back for individual work on the computer. Teachers also received the same independent study sheets that were given to the students as well as a catalog of programs housed in the Media Center. They were encouraged to get their license also.

At the inservice, the teachers were asked to fill out a survey on the potential use of microcomputers in the curriculum, identify software currently available in the media center that could be used to enhance learning in various subject areas, select computer awareness activities that would be applicable to their grade and to indicate preferences for scheduling students and future inservice.

INDIVIDUAL TEACHER MICROCOMPUTER SURVEY

Teacher _____ Grade/Subject_____

I. Does the microcomputer have potential use in these curriculum areas?

A. Mathematics
_____Logic
_____Problem solving
_____Drill and practice

B. Science
_____Reinforce concepts
_____Simulation activities (i.e., earthquakes)

C. Social Studies
_____Simulations of various periods of history
_____Map skills
_____Capitals and states

D. Language Arts
_____Prefixes and suffixes
_____Spelling

II. The following software is available in the media center. What programs could you use to enhance learning in the existing subject areas and units of work?

A. Tutorial
_____Ursa (constellations and telling time)
_____Fish (circulatory system of animals with two chambered hearts)
_____Quakes (locating earthquakes)
_____Prefixes
_____Metric system
_____Coordinate system
_____Solar distance
_____Minerals

B. Drill and Practice
_____Making change
_____Rounding numbers
_____Basic facts
_____Spelling
_____Estimating
_____States (capitals and location)

C. Simulations
_____Civil War
_____Fur trader
_____Oregon Trail
_____Voyager
_____Sell apples
_____Sell bicycles
_____Sell lemonade
_____Sell plants
_____O'Dell Lake (food web)
_____O'Dell Woods (animal survival)

D. Logic and Problem Solving
_____Bagels (clues for selecting correct number)
_____Hurkle (coordinate system)
_____Number (clues to guess the correct number)
_____Nomad (following directions on a map)

III. What computer awareness activities would be appropriate for your grade?
_____History of computers
_____Impact on society
_____Characteristics of a computer
_____Flowcharting
_____Programming
_____Computer usage
_____Computer and the future
_____Possible computer careers
_____Other_____

IV. What is your preference for scheduling student computer instruction and use?
Instruction
_____Large group
_____Small group
_____Individual or paired

Use

_____Small group
_____Groups of 2 or 3
_____Individual
_____Weekly basis
_____Sign up basis
_____Half hour time slots
_____15 minute time slots
_____Other_____

V. What is your preference for teacher inservice?

_____Volunteer basis
_____Primary Unit Inservice
_____Intermediate Unit Inservice
_____All faculty Inservice
_____Individual
_____Other

COMPUTER STUDY SHEET #1

Vocabulary

Terminal:	Keyboard similar to a typewriter that is used to communicate with the computer.
Video Monitor:	The TV-like unit used to display information.
Disk Drive:	Unit which can be used by a computer to read or record disks.
Disk:	Record-like magnetic-coated piece of material which contains programs or information. The disk must be handled with care.
Toggle Switch:	Switch in the back of the computer to turn power on.
Power Light:	Light which goes on to let you know the computer is on. This key does not press and is not considered a key.
Cursor:	Blinking square which appears on the screen that tells you the computer is ready for directions or commands.
Command:	A direction you give the computer.
Program:	The information stored on a disk.
Software:	Disk.
Hardware:	Equipment needed to run the program or disk.
Menu or Catalog:	A list of all the programs on a disk. One disk contains many programs even though it is very small.

Important Keys to Know

Return:	Most important key on the keyboard. This must be pressed after every response or command you give the computer.
Space Bar:	Long bar in front of the keys which is pressed to give spaces between words or numbers. The computer may tell you to press this bar at various times.
Shift:	Hold this key when you want the top character on another key. Example: If you want the $ sign, hold down on shift while pressing S+4.

Key with ← acts as a back space. It is used to correct spelling errors.

COMPUTER STUDY SHEET #2

Steps in using the computer

1. Pass the written tests on vocabulary and operation.
2. Pass the hands on test using the computer and become licensed.
3. The media specialist and your teacher will schedule a time for you to come to the media center to use the computer.
4. Come to the media center on time. When your time is up, you must stop even if you are in the middle of a program. This is only fair to your fellow students.
5. The first thing you will do when you are going to use the computer is to turn on the monitor (television).
6. Lift the door on the disk drive (by pushing up) and insert the disk by holding on to the paper edge, thumb on top. Do not touch the shiny black surface. This could ruin the disk.
7. Close the door of the disk drive by gently pushing down.
8. Turn the Apple on by pushing up on the toggle switch which is located on the back, left corner.
9. The power light will go on.
10. A red light on the disk drive will go on and the disk drive will make a whirring noise.
11. When the red light goes out and the whirring stops, the program is in the Apple's memory.
12. A cursor will appear on the screen to let you know the Apple is ready for your commands. It will do nothing until you tell it to.
13. Depending on the disk you are using, the commands may vary from telling you to print, catalog, run, press return or space bar.

14. Remember to touch return after you have typed in a response.

15. When you are done using the computer, follow these steps in order:

    A. Carefully remove the disk and put it back in the jacket.
    B. Put the disk in the special plastic storage area (upright).
    C. Turn off the Apple and the monitor.

16. Always ask for help if you are not sure what to do!

COMPUTER VOCABULARY TEST #1

Name _____ Grade _____ Teacher _____

Use the following terms to complete the below statements.

terminal	power light	return
video monitor	cursor	space bar
disk	command	shift
disk drive	program	←
toggle switch	software	
menu or catalog	hardware	

1. The blinking square which appears on the screen to let you know the computer is waiting for your instructions is called the _____.
2. _____ is the most important key on the keyboard.
3. The switch in the back of the computer to turn power on is called the _____ _____.
4. The _____ is the TV-like unit used to display information.
5. The light which goes on to let you know the computer is on is the _____ _____.
6. _____ is the information stored on the disk.
7. _____ acts as a back space to correct typing mistakes.
8. A direction you give the computer is called a _____.
9. _____ is a keyboard similar to a typewriter that is used to communicate with the computer.
10. A record-like magnetic-coated piece of material which stores the program is called a _____.
11. _____ _____ is the equipment needed to run the program.
12. _____ _____ is the unit which can be used by the computer to read or record disks.
13. The long bar in the front of the keys which you press to leave a space between characters or letters is the _____ _____.
14. _____ _____ _____ is a list of all the programs on a disk.

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COMPUTER OPERATION TEST #3

Name _____ Grade _____ Teacher _____

1. You must always press the _____ key after typing a response or command.
2. What is turned on first?
3. Which is done first? (circle one)
   A. Loading the disk into the disk drive.
   B. Turning on the Apple.
4. Explain how you are to handle the disks.
5. What does it mean when the red light goes off and the whirring noise stops?

   Do you ever take the disk out of the disk drive when the red light is on?
6. What is the power light for?

   Do you ever press it?
7. How do you know when the Apple is ready for your commands?
8. How do you get the top characters on the keys printed?
9. List the exact order of the steps you follow when you are done using the computer.

   A.

   B.

   C.
10. Above all, remember to ask for _____ if you are not sure what to do or if there seems to be a problem.

Example of student schedule

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	Jill S. Barb S.				
9:30		Joe J. Tom P.			
10:00			Sally B. Mary H.		
10:30				Bill F. Rob G.	
11:00					Linda Y. Patti R.
11:30	Jeff E. Brian H.				
1:00					
1:30					
2:15					
2:45					

With special arrangements, the student may be able to use the computer before school, at noon, during recess or after school.

During days the student is absent or special events are planned, the time may be made up during open time slots if available.

Scheduled times must be agreed upon between the teacher and the media specialist. The student is not to change the time unless both of the above are consulted.

CHAPTER II
COMPUTER MANUAL

Introduction

Welcome to the world of computers. Computers have proven to be a valuable asset to man and have many advantages over humans. They work without getting tired, they follow instructions without making errors and they do not forget. However, computers cannot think!

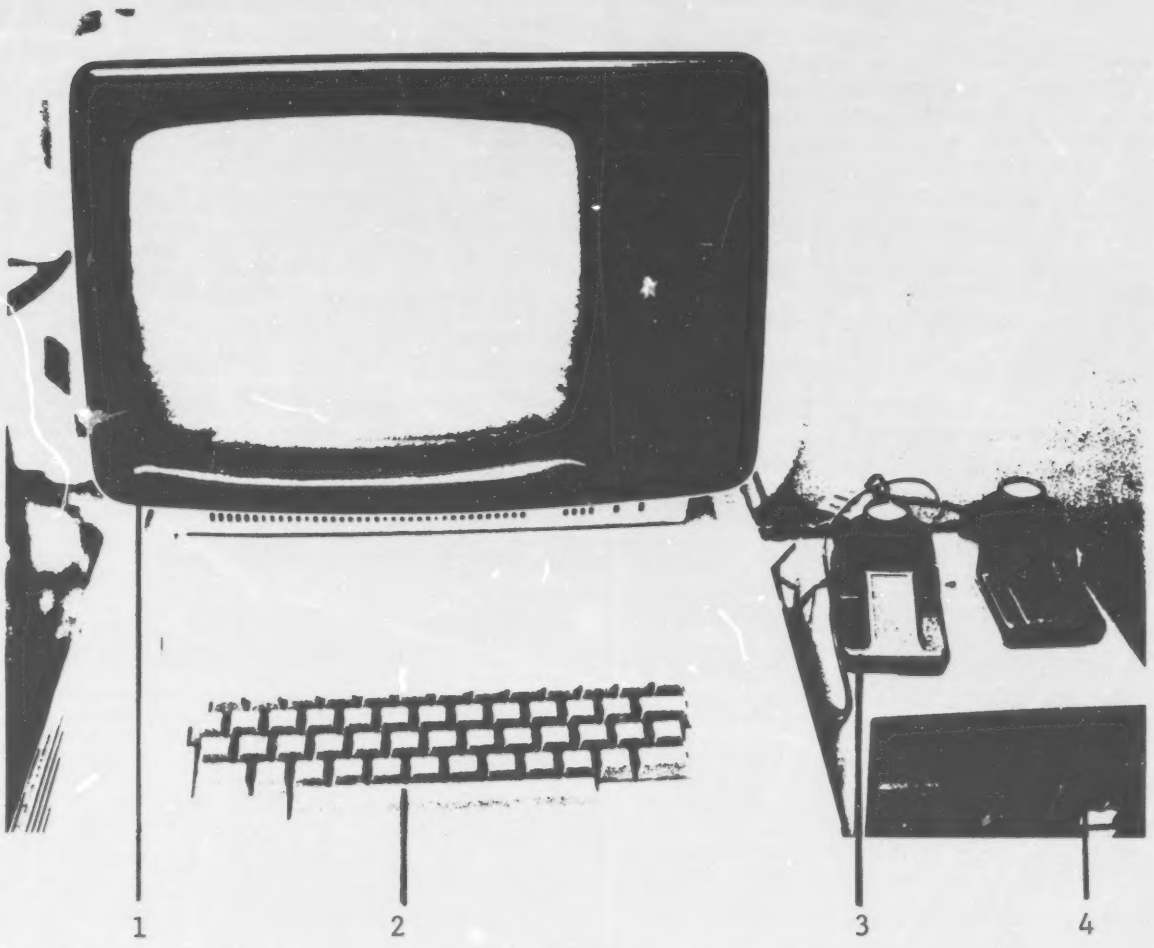
Humans are masters over computers. Therefore, you need to know some basic information about how to run the computer as well as computer language and writing simple programs.

GOOD LUCK!

"COMPUTING MADE EASY"

This manual has been designed to help students and teachers effectively utilize the Apple II microcomputer to run programs for drill and practice, problem solving, simulations, and tutorial lessons. Also, it will teach students and teachers how to write simple programs and most important, become computer literate.

Computer Hardware



1. **Video Monitor** is essentially a television receiver or set.

2. **Terminal** is a device with a keyboard like a typewriter that processes input and output of data.

3. **Disk Drive** is the part of the computer which feeds information into the main terminal.

4. **Paddles** are used for various games, drawing graphics or special effects.

DISKS

The disks are record-like magnetic-coated pieces of material which contain programs or information. The disk is permanently sealed in a square black plastic cover which protects it, helps keep it clean and allows it to spin freely. This package is never opened. Never let anything touch the brown or gray surface of the disk. Handle by the black plastic cover only or by the label.

Fingers

Pencils

Magnets

Heat and Cold

No-No's

Terminal Keyboard

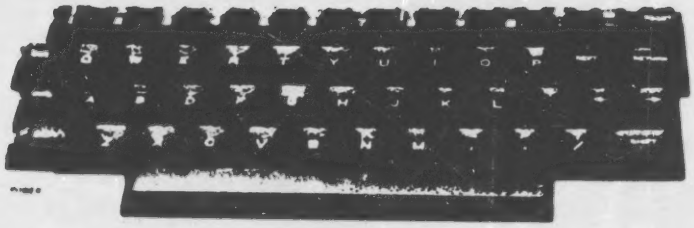
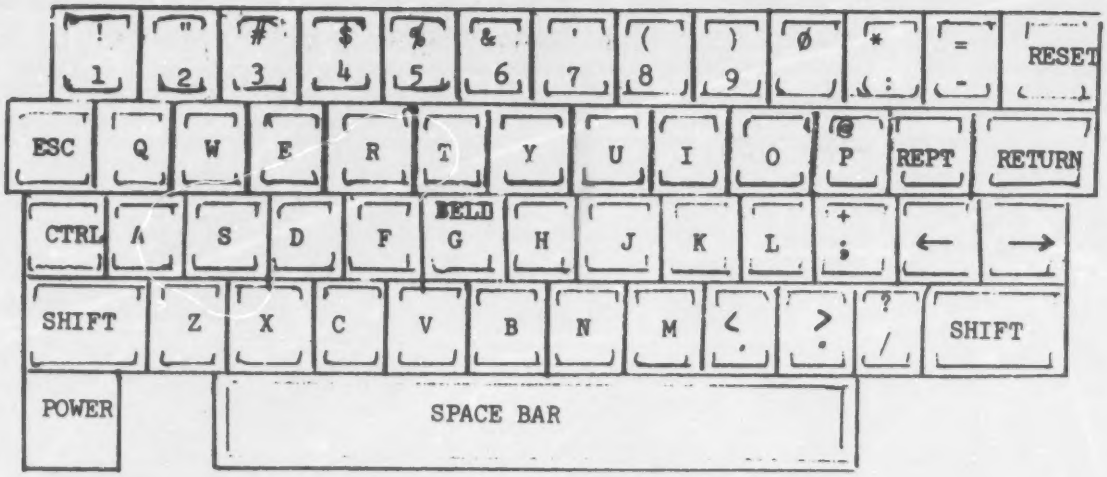


DIAGRAM OF KEYS



Study the keyboard. It looks like a typewriter, but there are some differences. There are only capital letters on the Apple II. Notice that some keys have only one symbol, while others have two, one above the other. In this case the lower symbol is the primary one.

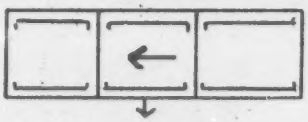
KEYS AND SYMBOLS TO KNOW

KEY	DEFINITION OR USE
0	represents zero
+	represents addition
–	represents subtraction
*	represents multiplication
/	represents division
REPT	means repeat. By holding down on this key and touching another key, the character will continue to repeat itself across the screen.
ESC	means escape. To get out of some programs you hold CTRL key down, touch C and then ESC.
CTRL	means control. This key is used in a combination of ways. Example: If you want to get back to the beginning or menu of a disk, hold down on CTRL, touch C, then RESET. Type RUN HELLO. This should bring you back to the menu or catalog.

OTHER CONTROLS

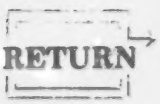
POWER

Power light indicates the computer is on.

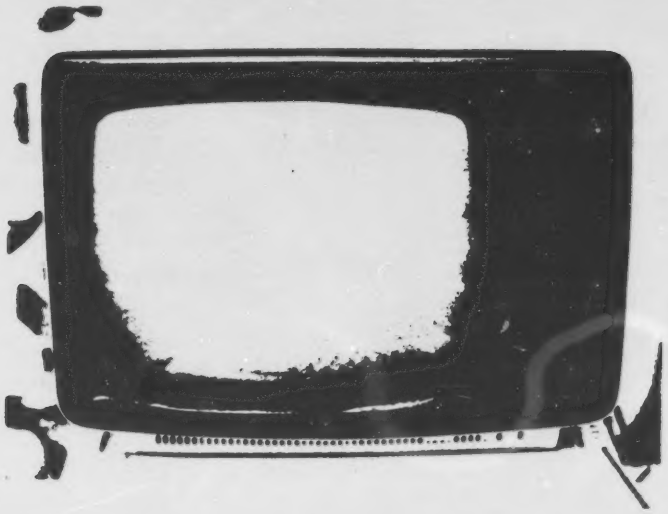


Back space used for correcting errors.

Space bar to give space between words or to continue on in a program.

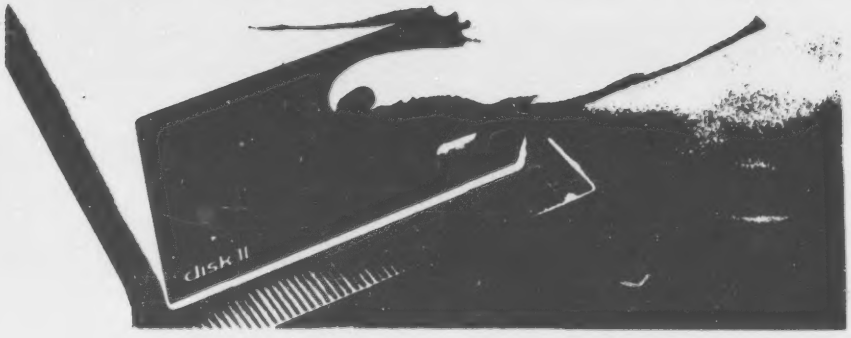


Return key is always pressed after typing a response or command.



On Switch

1. Turn on the video monitor.



2. Lift the door of the disk drive by gently pushing up.

3. Take the disk out of the paper jacket by holding on to the paper edge. Do not let anything touch the shiny black surface in the oval or circle area. Be extremely careful this area does not get scratched as it would ruin the disk.

4. Insert the disk into the disk drive. Do not force it in. Close the door of the disk drive by gently pushing down.

5. Turn on the Apple II by pushing up on the toggle switch which is located on the back of the terminal in the left hand corner.

   A. The power light will go on.

   B. A red light on the disk drive will go on and the disk drive will make a whirring sound. When the whirring stops and the red light goes out, the program is fed into the terminal.

   C. After a few seconds, the menu or catalog will appear on the screen.

6. Type the number of the program you wish to run and touch the "RETURN" key. The red light will go on again and the whirring noise will also be heard. The computer is searching for the program you selected.

   Caution! NEVER remove a disk from the disk drive while the drive's "IN USE" light is on. This may permanently damage the disk and is almost certain to destroy the information on it.

7. The cursor (the blinking square) will appear on the screen to let you know the Apple II is ready for your commands or responses. The computer will do nothing until you tell it to. It is very patient.

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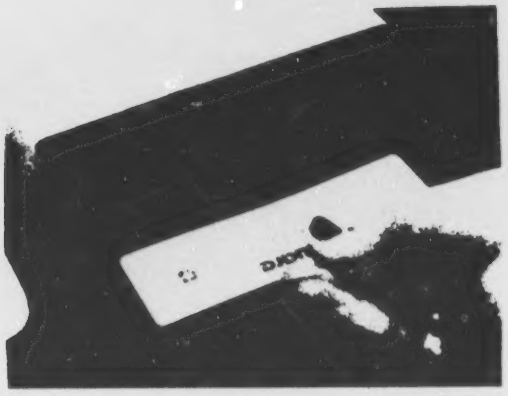
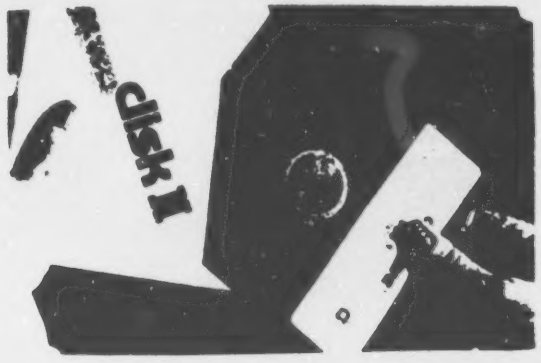
8. **Press RETURN after you have typed in a response or command. Occasionally the computer will tell you to press space bar to go on.**

9. **When you are through using a disk or are done using the computer, follow these steps in the exact order.**

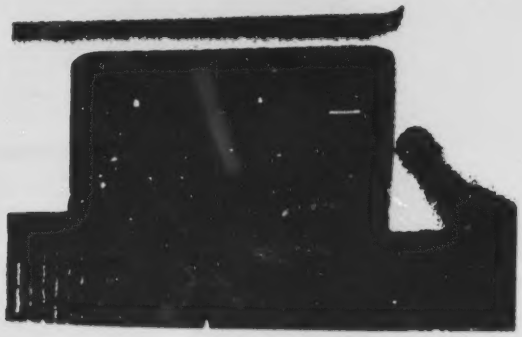


A. Carefully remove the disk from the disk drive.

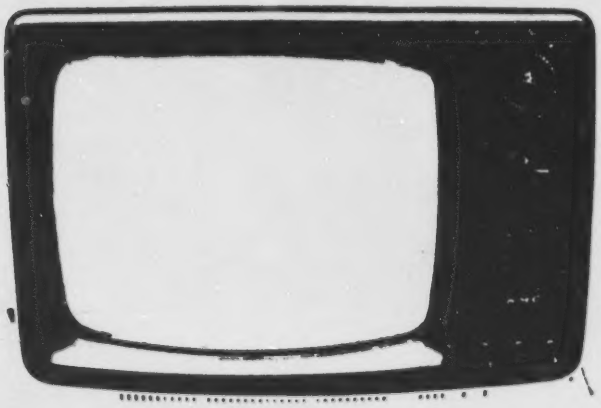


B. Put the disk in the paper jacket, being careful how you handle the disk. The jacket is specially treated to protect the disk from dust. It is important that the disk be stored in the jacket when not in use.

The disks should be stored in an upright position in the diskette storage unit. They should never be put on top of the video monitor.



C. Turn off the Apple II. Push down on the toggle switch.



D. Turn off the video monitor.

Note: Only licensed students will have access to the computer unless they are with an assigned group under the supervision of an instructor or licensed student.

GO ON TO THE NEXT PAGE TO SEE HOW YOU CAN BECOME A LICENSED COMPUTER OPERATOR!

How to Become a Licensed Computer Operator

1. Become familiar with the following independent study sheets:

   A. Computer terminology
   B. Computer operation

2. Take the written tests on computer terminology and operation.

3. Take the performance test on the Apple II microcomputer.

4. If successful, you will receive a license. Misuse or abuse of the computer or violation of rules for using the computer may cause your license to be revoked for a period of time.

5. Once you are licensed, you are certified to use the Apple II on a scheduled basis as well as at times the computer is unoccupied.

EXAMPLE OF COMPUTER LICENSE & PROGRAM

COMPUTER OPERATOR'S LICENSE

This is to Certify that _____

of _____ has passed all
school

requirements for operating the Apple II.

_____ _____
date Media Specialist

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	Jill S. Barb L.				
9:30		Joan P. Greg W.			
10:00			Ken S.		
10:30				Larry K. Bill B.	
11:00					Jeff E. Tracey
11:30					
1:00					
1:30					
2:15					
2:45					

Be a Computer Literate

There are several computer books in the Media Center which you will enjoy reading. Some of the titles are:

Ball, Marion J. and Charp, Sylvia **Become a Computer Literate.**

D'Igazio, Fred and Gillian, Stan. **Katie and the Computer.**

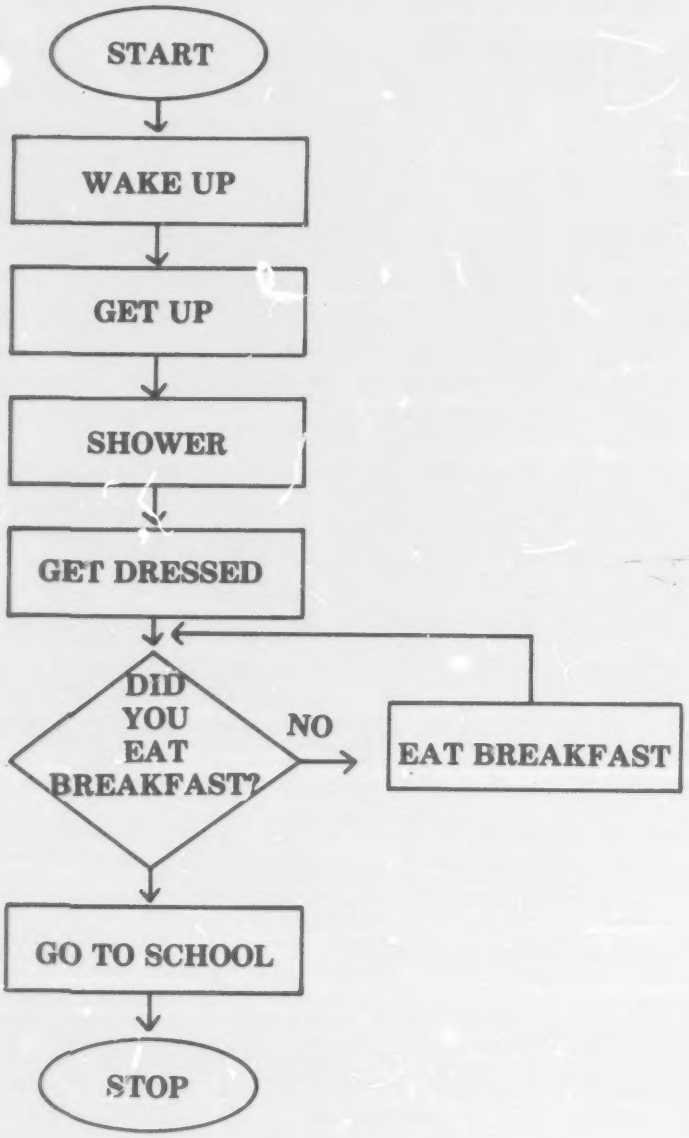
Larson, Sally Greenwood. **Computer for Kids.**

Lewis, Bruce. **Meet the Computer.**

Rice, Jean. **My Friend the Computer.**

Richardson, Richard Kay. **One Computer, Thirty Kids.**

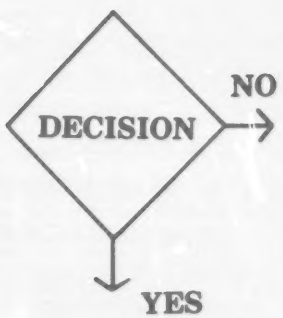
SAMPLE OF A FLOW CHART



Flow Charting and Programming

Before a programmer writes a program, he must think of all the steps he will use in his program. He must put his steps in order. To help plan the steps, a flow chart is used. It is like a road map or drawing of all the steps used to solve a problem. It shows how each step is connected to the other steps.

These symbols are used when making a flow chart.

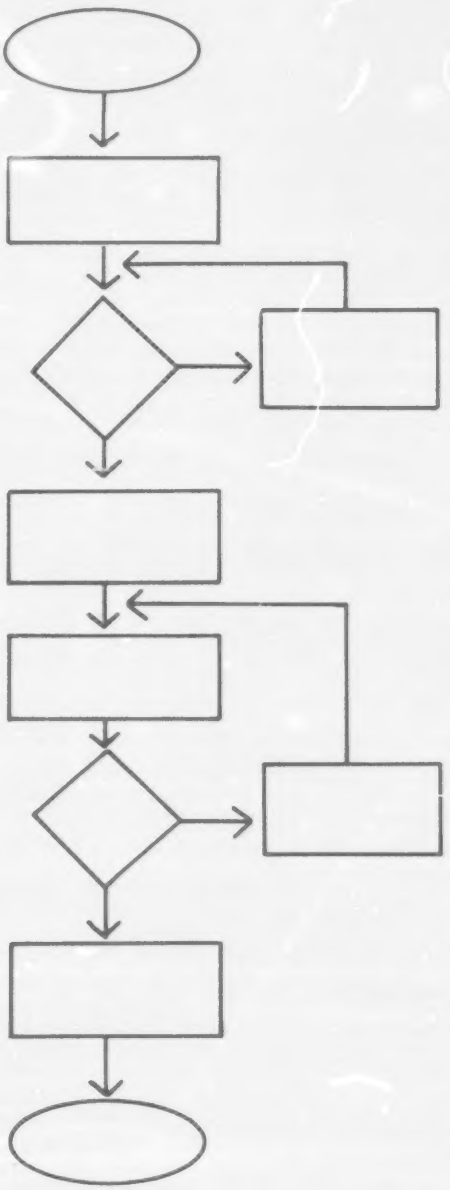


Looping is used with the decision symbol. This can lead you away from the regular path of the flow chart.

PRACTICE IN PUTTING INFORMATION IN A FLOW CHART

Put the following steps for riding your bicycle in the proper symbols. Use the number of the step.

1. Pump air into tires
2. Go around block
3. Get on bicycle
4. Ride back home
5. Start
6. Is the chain loose?
7. Start riding
8. Tighten the chain
9. Stop
10. Do tires need air?



Make a list of things you like to do.

EXAMPLE: Go camping _____

_____

_____

_____

_____

Using the symbols below, make a flow chart of one of the things you like to do. List the steps, in order, before you draw the flow chart.

After a programmer has written a flow chart, he writes the program. In the BASIC language, every instruction goes on one line, called a statement. Every statement begins with a whole number. This number is called the statement or line number.

10 PRINT 5 + 6 is a statement telling the computer to print the sum of 5 and 6.

Every program must have an END statement before the program will work. This must be the highest number in the program.

10 PRINT 5 + 6
20 PRINT 5 + 7
30 END The output of this program will be 11 and 12.

To tell the computer to print a sentence, we put the whole sentence in quotation marks.

10 PRINT "I am computer literate"
20 END The output would be **I am a computer literate.**

To print the problem and the answer, the program would look like this.

10 PRINT "5 + 6 =" 5 + 6
20 END The output would be 5 + 6 = 11.

To change a line, simply retype the whole line.

```
10 PRINT "Sylvester Stallone"
20 PRINT "Sylvester Brandon Stallone"
20 PRINT "Sylvester and Vanessa Stallone"
```

To add lines, use numbers between numbers such as 11, 17, etc. The computer will automatically put them in the right order.

Sample Program

```
10 PRINT "Sylvester Stallone"
10 PRINT "Sylvester Stallone"
20 PRINT "1410 B Kings Way"
30 PRINT "Anywhere, U.S.A."
40 END
35 PRINT "Today is July 7, 1982"
```

The output would be:

```
Sylvester Stallone
1410 B Kings Way
Anywhere, U.S.A.
Today is July 7, 1982
```

Basic Programming Problems

The following are examples of INPUT and OUTPUT for a mathematical problem.

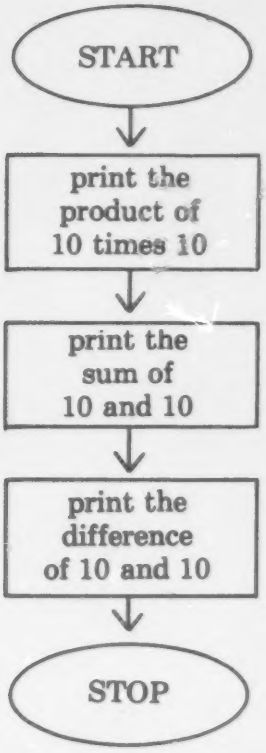
INPUT	OUTPUT
10 PRINT 5 + 15 =	20

Tell what the OUTPUT would be for the following problems: The commas placed between the problems tell the computer to leave spaces between the answers.

	INPUT	OUTPUT
1.	10 PRINT 25 + 10 20 PRINT 20 - 5 30 END	
2.	10 PRINT 4 - 3 20 PRINT 16 - 4 30 PRINT 23 - 3 40 END	
3.	10 PRINT 7 + 4 20 PRINT 12 + 16, 18 + 2 30 PRINT 50 + 10, 100 - 50 40 END	
4.	10 PRINT 5 + 4, 5 - 1, 5 * 4 20 END	
5.	10 PRINT 3 + 3, 6 - 3 20 PRINT 2 * 3, 3 / 3 30 END	
6.	10 PRINT 3 - 1, 6 + 2, 8 * 2 20 PRINT 2 / 2, 3 * 3, 3 + 1 30 PRINT 4 + 2, 10 / 2, 3 - 1 40 PRINT 100 / 2, 500 * 500, 1000 * .0001 50 END	

Below is an example of how to flow chart and program problems and put them in one program.

FLOW CHART



PROBLEMS

10 times 10
10 plus 10
10 minus 10

PROGRAM

```
10 PRINT 10 * 10
20 PRINT 10 + 10
30 PRINT 10 - 10
40 END
```

Run it on the computer!

Draw a flow chart and program for the following problems.

Add 300 and 700
Subtract 300 from 1000
Multiply 100 times 10

Glossary

ANALOG COMPUTER: a computer which compares one thing to another, such as a scale.

ARITHMETIC UNIT: the part of the computer that does the mathematics of a problem.

BASIC: an easy computer language used by beginners.

BUGS: errors in a computer program.

BOOT: getting the computer ready to accept certain disks.

CATALOG: a list of programs on a disk.

CHARACTER: a number, letter or symbol to be typed.

COMMAND: a direction you give the computer.

COMPUTER: a machine with a memory like a calculator which accepts information, works on the information to solve a problem and puts out the answer.

CONTROL UNIT: a part of the computer that directs the flow of data through the computer.

CPU: Central Processing Unit.

CURSOR: a blinking square which appears on the screen of the video monitor that tells you the computer is waiting for your response.

DATA: information a computer needs to solve a problem.

DISK: record-like magnetic-coated piece of material which contains programs or information.

DISK DRIVE: part of the computer which feeds information into the main terminal by reading the disk and can also be used to record information onto a disk.

END: the statement in a program which has the highest statement number.

FLOWCHART: a drawing or map that tells the steps needed to solve a problem. It also shows the correct order for doing the steps.

HARDWARE: the complete machinery needed in a computer set up.

INPUT: information fed into the computer.

KEYBOARD: a set of labeled keys to permit the entry of information into a computer.

LANGUAGE: instructions consisting of a series of numbers or a coded pattern of digits which convey information between people and machines.

MEMORY: a device within a computer which is capable of storing information.

OUTPUT: the answer to a problem which comes out of a computer.

PROGRAM: a set of instructions which tells the computer what to do.

RUN: a command telling the computer to execute a program.

SOFTWARE: the disks containing programs that are used in the computer.

TERMINAL: a device with a keyboard like a typewriter that is used to communicate with the computer.

TOGGLE SWITCH: the switch in the back of the Apple II terminal to turn the power on.

USER: person using the computer system.

VIDEO-MONITOR: TV-like unit used to display information.

SOFTWARE SELECTION

It is recommended that a committee, consisting of teachers and the media specialist, be established to help select software. Input should also come from the students and the administration. It is strongly suggested that a selection policy or guide be developed which the committee would follow. The committee would identify and suggest titles to the media specialist who would make the final decision for purchase based on reviews, preview if possible and the following criteria.

Criteria

I. Are goals clearly specified?

II. Who is the software designed for?

III. Has the material been validated?

IV. Does the program cross grade levels?

V. How much preparation time is needed by the teacher?

VI. Are instructions clear?

VII. How long does the program last?

VIII. Is there keyboard confusion? (i.e., 0=0)

IX. Does the program interact with the student by using his name?

X. Does the program produce a performance report?

XI. What is the nature of reinforcement through the program?

XII. Do the programs support the present curriculum?

XIII. Is there opportunity for the student to control the sequence of information presented in the program?

XIV. Can the student recall or review information previously given on the screen?

XV. Does the teaching guide include follow-up activities?

The following page is a copy of an evaluation form for use in purchasing and selecting software.

Sources

A preliminary search was made to identify who produced software and where it could be purchased. Commercial publishers represent the vast majority of education software on the market today. These range from the small garage shop operation to the multi-million dollar education publishing house.

From the larger companies, prices tend to be higher. However, the software tends to be more completely suited to school usage with teacher's guides, instructional guides, instructional objectives clearly defined and well tested and documented packages.

Non-commercial sources of software are often not as well known since they are not advertised or sold through computer stores.

The Minnesota Educational Computing Consortium (MECC) was formed in 1973 by the public educational systems in Minnesota to coordinate and provide computer services to students, teachers, and educational administrators throughout Minnesota.

Total Information Educational Systems (TIES) is a data processing service organization for some of the Minnesota School Districts. They have a large amount of instructional material.

SOFTWARE EVALUATION CHECKLIST

I. PRODUCT DESCRIPTION

____K-3 ____4-6 ____7-9 ____10-12

A. Title _____
B. Publisher_____Publication Date_____
C. Format _____
D. Cost _____
E. Grade Level_____Subject Area_____
G. Type of Program:
_____Drill and Practice
_____Simulation
_____Tutorial
_____Problem Solving
_____Information Retrieval
_____Gaming

II. EDUCATIONAL CONTENT

_____Is the content accurate?
_____Is this compatible with the district's curriculum and materials already in use?
_____Is the content appropriate for its intended users?
_____Is the instructional objective clear?
_____Content is designed for which type of student need?

____Average ____Gifted ____Remedial ____Special Needs

III. EASE OF USE

_____Student is able to load independently.
_____Instructions are clear.
_____User can skip over familiar instructions.
_____User can get help by returning to directions or menu.

IV. STUDENT INTEREST

_____Program allows for interaction with the computer.
_____Information is presented in a variety of formats.
_____Materials are of an appropriate length for the subject and level.
_____Wrong answers are treated non-threateningly.
_____Appropriate reinforcement for students is provided throughout the program.

V. USE OF COMPUTER CAPABILITIES

_____Graphics and sound contribute to the program
_____Computer is an appropriate medium for accomplishing the objectives of this program
_____Program has made use of the computers capabilities

VI. SUPPORT MATERIALS

_____Documentation provided
_____Teacher training would be necessary to effectively utilize this program.
_____Supplementary activities are provided for student use

VII. EVALUATION SUMMARY:

RECOMMENDED FOR PURCHASE: YES_____ NO_____

EVALUATED BY_____DATE_____

Two of the most helpful tools for identifying sources and programs are: **Educational Software Directory; Apple II Edition** (Uanchaca, Texas: Sterling Swift Publishing Co., 1981). Specify what computer you are using when ordering.

Software Directory for the Apple Computer Volume 3 - Education (New York, N.Y.: Schribner Book Co., 1982).

The following are some sources of software that were identified that produce material for Pet, Atari, TRS-80, and Apple II.

Software Sources

Indianhead Software
1002 Indianhead Drive
Snow Hill, NC 28580

Compress, Inc.
P.O. Box 102
Wentworth, NH 03282

Creative Publications
3977 East Bayshore Rd.
P.O. Box 10328
Palo Alto, California 94303

Edu-Soft
4639 Spruce St.
Philadelphia, PA 19139

Edu-Ware Services
P.O. Box 22222
Agoura, CA 91301

Micro Power and Light Co.
12820 Hillcrest Rd.
Suite 224
Dallas, TX 75230

Orogram Design Inc.
11 Idar Court
Greenwich, CN 06830

Marck
280 Linden Ave.
Branford, CT 06405

Midwest Visual
2700 S. 163rd St.
New Berlin, WI 53151

Resource Center Media Company
121 East 94½ Street
Bloomington, MN 55420

Dormac, Inc.
P.O. Box 752
Beaverton, Oregon 97075

Educational Activities, Inc.
P.O. Box 392
Freeport, New York 11520

Orange Cherry Media
7 Delano Drive
Bedford Hills, NY 10507

Hartley Courseware, Inc.
P.O. Box 431
Dimondale, MI 48821

Random House School Division
400 Hahn Rd.
Westminster, Maryland 21157

Eye Gate Media Inc.
146-01 Archer Ave.
Jamacia, NY 11434

Creative Computing
39 E. Hanover Ave.
Morris Plains, NJ 07950

Milliken Publishing Company
1100 Research Blvd.
St. Louis, Missouri 63132

Scholastic Inc.
904 Sylvan Avenue
Englewood Cliffs, NJ 07632

Queue
5 Chapel Hill Dr.
Fairfield, CT 06432

Gamco Industries Inc.
Box 310 P
Big Spring, TX 79720-0120

Varis Associates
P.O. 893
Hicksville, NY 11802

Scott, Foresman and Company
Electronic Publishing, A-069
1900 East Lake Avenue
Glenview, IL 60025

The Micro Center
P.O. Box 6
8950 Lurline Ave., Dept. 47A
Chatsworth, CA 91311

Society for Visual Education, Inc. (SVE)
1345 Diversey Parkway
Chicago, IL 60614

Borg-Warner Education Systems
600 West University Drive
Arlington Heights, IL 60004-1889

K-12 MicroMedia Inc.
P.O. Box 17
Valley Cottage, NY 10989

Science Research Associates, Inc. (SRA)
155 North Wacker Drive
Chicago, IL 60606

Sunburst
Room VC4 39 Washington Ave.
Pleasantville, NY 10570

Other computer resources are newsletters and periodicals. Some of these include:

Computer Newsletters

Dataline
2520 Broadway Drive
St. Paul, MN 55113

Computer-Using Educators (CUE)
Don McKell
Independence HS
1776 Education Park Drive
San Jose, CA 95133

Computers and the Media Center
820 East Minnesota Street
Cannon Falls, MN 55009

Computer Courseware Services
300 York
St. Paul, MN 55101

Minnesota Software Inc.
5422 Fisher Street
White Bear Lake, MN 55110

MECC Users Newsletter
2520 Broadway Drive
St. Paul, MN 55113

Computer Periodicals

Creative Computing
P.O. Box 789-M
Morristown, NJ 07960

The Computing Teacher
Dept. of Computer & Information Science
University of Oregon
Eugene, OR 97403

Classroom Computer News
P.O. Box 266
Cambridge, MA 02138

Electronic Learning
Scholastic Inc.
P.O. Box 2580
Clinton, Iowa 52735

Recreational Computing
P.O. Box E
Menlo Park, CA 94025

Educational Computer
P.O. Box 535
Cupertino, CA 95015

CHAPTER IV

Organizing a Student Computer Club

Most of us involved with microcomputers have heard of or are members of a computer users group which shares ideas, techniques, and exchanges programs. What an excellent opportunity this can also be for students who are really into computers and have a need for an extension of the basic computer curriculum and use of prepared programs.

To establish the club, one must first set the guidelines as to whom the club will be open to and what kind of participation will be required. It is recommended that membership into the club requires the following:

1) The student be in grade four, five or six
2) The student must have a computer operator's license
3) The student must be willing to give up noon recess (30 min.) once a week for a group session.
4) The student must agree to follow-through with activities and be willing to share information.

In order for the students to have access to the computers and resources, plus assistance from the media specialist or instructor it is suggested that the membership be limited to twenty-five students. As interest grows, it may be necessary to invite a second group during another time period.

The student computer club can participate in previewing new software, receiving computer program instruction, sharing ideas and much more. The following activities and resources are identified as the main functions of the group:
group:

1. Use **Computers for Kids**, or similar handbook as a basic text or guide. This is a basic program - manual written just for kids. Students are asked to purchase this on an individual basis (provisions can be made to borrow or share a copy if unable to purchase one). It may be desirable to purchase a set of 25 books through the Media Center and have the students check them out for their use during the time they are working on club activities.

2. Use activities from **Computer Tutor**, by Sandra Markle. This is a reproducible book designed to acquaint students with computers, the way they work and the language they use.

3. Use **Basic Discoveries**: A Problem Solving Approach to Beginning Programming. This reproducible book is designed to present computer programming in the BASIC language to students in grades four and above through an exploratory and problem solving approach.

4. Design and construct computer-related bulletin boards for the computing center. Students can work in small groups to plan and construct the bulletin board. A time line is established for each group. Depending on the number of students in the club, the bulletin board can be changed every 2 or 3 weeks.

5. Compile computer scrapbooks with newspaper and periodical articles dealing with the impact computers have on our lives today.

6. Tutor students in grades one through three in using the microcomputer. Members act as assistants in doing the mechanics of loading the disk, etc. If you have for example, three microcomputers, one can be designated for primary student use and the other two designated for intermediate student use. Thus, the tutor and the tutees are scheduled at the same time but on different computers allowing each to use different programs while having the tutor available for technical assistance when needed.

It may be a challenge for these students to have a program of the week featured. Guidelines would be set in the program and upon meeting the criteria this student program would be presented, discussed, and possibly revised.

To allow this group to be even more creative it would add a great deal to your computing center by personalizing it with the kind of computers you are using. i.e., If your school uses the Apple Computer you could:

- Make the computer center into the "Apple House."
- An apple tree could have on the leaves or branches all of the names of the students who have a computer license.
- A ladder to the tree could be a flow chart showing the steps the student must follow to get a license.
- Apple seeds could verify basic programs students have written.
- Apple blossoms could be programs students have written at a little more advanced level.
- Grass roots or garden area could be master schedule in student use on the computer. The same kind of approach could be used in Radio Shack, Atari or Ret. etc.,

Students, given a brainstorming session on ideas such as this, are usually total uninhibited! You will be amazed at what they will produce, given some guidance, time and encouragement.

The time and effort put into organizing a student computer club is well worth the extra demands as you watch the growth and the excitement of the students mount as they run their own programs and show potential as our future computer experts.

References

1. Larson, Sally Greenwood. **Computers for Kids**. Morristown, NJ; Creative Computing, 1980.

2. Malone, Linda and Johnson, Jerry. **Basic Discoveries: A Problem Solving Approach to Beginning Programming**. Palo Alto, CA: Creative Publications, 1981.

3. Markle, Sandra. **Computer Tutor**. Learning Works, Inc., 1981. (Can be purchased through Opportunities for Learning;)

ANNOTATED BIBLIOGRAPHY OF COMPUTER BOOKS FOR STUDENTS

Baker, Eugene. **I Want To Be A Computer Operator.** Chicago: Children's Press, 1973.

Part of a career series exposing children to what a computer operator does. Recommended for K-3. $5.00.

Ball, Marion J. **What Is A Computer?** Boston: Houghton Mifflin, 1972. 92 p. illus. (drawings are cartoon-like and colored)

What is a computer, history of computers, parts of a computer system, summary and glossary. Excellent for children and adults in building a basic understanding of computers and the popular computing buzz words. Recommended for 4-6. $2.85 pa.

Ball, Marion J. and Charp, Sylvia. **Be A Computer Literate.** Morristown, NJ: Creative Computing, 1977. 61 p. illus. (drawings are cartoon-like and in color)

Introduction to computers, what goes on inside computers, language of the computer, how to write a simple program and how computers work for us. Recommended for 4-8. $3.95 pa.

Becker, Joseph. **The First Book Of Information Science.** Washington, DC: U.S. Energy Research and Development Administration, Office of Public Affairs, 1973.

Deals with putting information into a computer and getting information from the computer, as well as the future of computers. Recommended for 4-8.

Berger, Melvin. **Those Amazing Computers: Uses of Modern Thinking Machines.** New York: John Day, 1973.

Discusses the uses of computers in such areas as crime fighting, space flight, and medicine. The author also describes how computers work and explains the relationship between the human brain and the electronic brain. Recommended for 4-8.

Berger, Melvin. **Computers.** (Science is What & Why Series) New York: Coward, 1972. 46 p. illus. (line drawings are realistic)

Recommended for K-3. $4.49.

Blakeley, Barry and Lewis, Robert. **Living With Computers.** (Science in Action Series) Crane-Russak Co., 1978.

Recommended for 5-8.

Braude, Michael. **Larry Learns About Computers.** Minneapolis: T.S. Denison & Co., 1969.

Recommended for 3-6. $2.00.

Brown, Richard. **Computers.** New York: Viking, 1976.

Recommended for 6-8. $5.95.

Clark, John C. **Computers At Work.** New York: Grosset & Dunlap, 1971.

To satisfy modern needs, the computer has been developed to an almost thinking piece of hardware. The author selected interesting applications which illustrate their versatility in terms of what they can be made to do or will do in the future. Recommended for 4-6.

Cook, Joseph. **The Electronic Brain: How It Works.** New York: Putnam, 1969.

Traces the use of computers from the beginnings, through present applications and to future possibilities. An emphasis is also placed on the theory and procedure on which electronic brains are used. Recommended for 4-8.

Corbet, Scott. **Home Computers: The Simple Facts.** Boston: Little, 1980.

Recommended for 4-8.

De Rossi, Claude J. **Computers: Tools for Today**. Chicago: Children's Press, 1972.

Recommended for 5-7. $7.95.

D'Ignazio, Fred and Gillian, Stan. **Katie and The Computer**. Morristown, New Jersey: Creative Computing, 1979.

Journey with Katie inside the computer as she visits the land of Cybernia and learns how computers work. Katie follows Colonel Software every step of the way as he escapes the clutches of the evil "program bug" to make the computer follow Katie's commands. A wonderful introduction to those too young to program. Recommended for K-6. $6.95.

Goldreich, Esther and Goldreich, Gloria. **"What Can She Be? A Computer Scientist."** New York: Lothrop & Lee & Shepard Co., 1979.

Linda Wong is a computer scientist. Clients hire Linda to study their problems and see how computers help solve them. The text and photos follow Linda through the project. A fascinating introduction to the world of "thinking machines" and the variety of job opportunities it holds. Recommended for 3-6.

Halacy, D.S., Jr. **What Makes A Computer Work?** Boston: Little Brown & Co., 1973. 64 p. illus. (line drawings are realistic)

Recommended for 3-5.

Jones, Weyman. **Computer: The Mind Stretcher**. New York: Dial, 1969. 120 p. illus. (line drawings are realistic)

Problem solving, computer arithmetic, and telling the computer what to do. Recommended for 4-8.

Kohn, Bernice. **Computers at Your Service**. Englewood Cliffs, NJ: Prentice-Hall, 1962.

Recommended for 4-7.

Larson, Sally Greenwood. **Computers for Kids.** Morristown, NJ: Creative Computing, 1980.

Twelve chapters of information that take you through everything programmers learn. It is easy to understand and the large type makes it easy to read. You will find out how to put together a flow chart and how to get your computer to do what you want it to do. Recommended for 3-8. $3.95.

Lewis, Bruce. **Meet The Computer.** New York: Dodd, Mead, 1977. 49 p. illus. (line drawings are cartoon-like)

Recommended for 4-7. $5.95.

Meadow, Charles. **The Story of Computers.** New York: Harvey House, 1970. 124 p. illus. (line drawings are realistic)

Machines that do arithmetic, computers use binary numbers, how computers work, you can tell computers what to do, going to the moon—a problem the computer solves and computers can teach us. Recommended for 5-8. $6.29.

O'Brian, Linda. **Computers.** (First Books) New York: Watts, 1978.

A first introduction to computers. Recommended for 4-6. $4.90.

Piper, Roger. **The Story of Computers.** New York: Harcourt, 1964. 186 p. illus. (photographs)

Almost certainly they have you in mind, computers, are they human?, a million thoughts a minute, how the computer gets the story, learning electronic language, the computer's memory, inside the computer's brain, more about the computer's brain, the minds behind the computer, computers that can imitate, the smaller the better and careers among the computers. Recommended for 4-9.

Ray, JoAnne. **"Careers In Computers."** Minneapolis: Lerner, 1969.

An introduction to the varied careers in the computing field, including design engineer programs, keypunch operator, assembler, production foreman and others.

Rice, Jean. **My Friend the Computer**. Minneapolis: T.S. Denison & Co., 1976. 85 p. illus. (line drawings are cartoon-like, photographs)

What is a computer, how are computers used, history of computers, how does a computer work, devices used to get information into and out of a computer, how to plan a computer map (flow chart), how to tell a computer what to do (programming) and an appendix. Recommended for 4-up. $3.95.

Richardson, Kay. **1 Computer, 30 Kids**. Indianapolis: Meka, 1980.

The real challenge is in creating programs, but beginning programmers need experience with the mechanics of the programming language. This workbook is designed to help students with the mechanics of BASIC programming.

Rusch, Richard B. **"Man's Marvelous Computer: the Next Quarter Century."** New York: Simon & Schuster, 1970.

Recommended for 4-7.

Scharff, Robert. **The How and Why Wonder Book of Robots and Electronic Brains**. New York: Wonderbooks, Division of Grosset & Dunlap.

Recommended for 4-7.

Scrivastava, Jane Jonas. **Computers**. New York: Crowell, 1972. 33 p. illus. (line drawings are realistic)

The author carefully explores what computers can and cannot do and how they work and where their information is helpful to us.

Recommended for 4-6. $6.89.

Spencer, Donald. **The Story of Computers**. Ormand Beach, FL: Camelot Pub. Co., 1977. 64 p. illus. (line drawings are cartoon-like)

What are computers, who invented computers, what kinds of computers are there, how does a computer work, how do I tell a computer what to do, and what are useful computer terms. Recommended for 4-9. $9.95.

Steinberg, Fred J. **Computers**. New York: Watts, 1969.

Computer programming, processing units, the binary numbers, role of the computer in business, government, medicine, policework, and education are all discussed in this introduction to computer technology. Recommended for 4-9.

Vorwald, Alan. **Computers; From Sand Table to Electronic Brain**. New York: McGraw-Hill, 1970.

Beginning with finger counting, the author traces the way computers developed in answer to man's need for quicker more accurate information. Recommended for 4-7.

Wall, Elizabeth, **Computer Alphabet Book**. Nokomis, FL: Bayshore, 1979.

This book presents a direct, clearly written and very interesting approach to the ABC's of computer awareness. The author uses the alphabet to define and explain common computer terms. Each letter term is defined in the language and experience of primary age children. A clever way to practice the alphabet and learn computers at the same time. Recommended for 2-6. $8.95.

Doerr, Christine. **Microcomputers and the 3 R's—A Guide for Teachers.** Rochelle Park, New Jersey: Hayden Book Co. Inc., 1979.

Practical guide to the use of microcomputers in the classroom. This book shows you what computers can be used for in all phases of education.

Edwards, Judith B. et. al. **Computer Applications in Instruction: A Teacher's Guide to Selection and Use.** Hanover, NH: Timeshare, 1978. 202 p. illus.

Essentials of hardware and software, instructional uses of the computer and selecting computer-based instructional units.

Fields, Craig. **About Computers.** Cambridge, MA: Winthrop Pub., 1973. 133 p. illus. (a few realistic line drawings)

Deals with what computers can do, how they differ from other machines, instructions computers follow, how we can use computers easily and uses of computers.

Larson, Sally Greenwood. **Computers for Kids.** Morristown, New Jersey: Creative Computing, 1980.

Twelve chapters of information that take you through everything programmers learn. It is easy to understand and the large type makes it easy to read. You will find out how to put together a flow chart and how to get your computer to do what you want it to do.

Moursund, David. **Teacher's Guide to Computers in the Elementary School.** International Council for Computers in Education, La Grande, Oregon, 1980.

Booklet is written for preservice and inservice elementary school teachers who have had no formal training in the computer field. It is designed to help such people gain an initial level of computer literacy and to lay foundation for additional learning.

SELECTED ANNOTATED BIBLIOGRAPHY OF COMPUTER BOOKS FOR TEACHERS

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Collection of articles originally published in Creative Computing magazine.

Ball, Marion J. and Charp, Sylvia. **Be a Computer Literate**. Morristown, New Jersey: Creative Computing Press, 1977. 61 p. illus. (drawings are cartoon-like and in color)

What are computers, kinds of computers, communicating with the computer, language of the computer, how to write a simple program, how computers work for us and a glossary.

Ball, Marion J. **What is a Computer?** New York: Houghton Mifflin, 1972. 92 p. illus. (drawings are cartoon-like and in color)

What is a computer, history of computers, parts of a computer, how software is made, summary and glossary. Excellent for children and adults in building a basic understanding of computers and the popular computing buzz words.

Billings, Karen and Moursund, David. **Are You Computer Literate?** Portland, OR: Dilithium Press, 1979.

An excellent introduction to the history, capabilities, role and future of computers in our society. Each chapter includes a short quiz.

Brown, Clement. **Questions and Answers on Computers**. London: Newnes-Butterworths, 1969. 94 p. illus. (line drawings are realistic)

Introducing computers, elements of computing, programming, data processing, computers and science, computers in industry, microelectronics, trends in computing and glossary.

Nuffield Foundation. **Computers and Young Children**. Edinburgh, London, NY. W & R Chambers, 1972. 63 p. illus. (some color)

Why computers?, flow charts, a classroom human computer, presenting the program to the computer and working with a computer.

Poirot, James L. **Computers in Education**. Manchaca, Texas: Sterling Swift, 1980.

Geared for non-computer science teachers who anticipate the introduction of microcomputers into their schools.

Poirot, James L. and Groves, David N. **Computer Science for the Teacher**. Manchaca, Texas: Sterling Swift Publishing Co., 1976. 262 p. illus. (photographs)

This is especially designed to be meaningful to a teacher or future teacher, otherwise unfamiliar with the computer, but with a need to teach a course in computer science or to implement the computer in the classroom. Information on the "how to" and "whys" of teaching along with the "what" to teach is included.

Poirot, James. **Microcomputer Systems and Apple Basic**. Manchaca, Texas: Sterling Swift, 1980.

Teachers considering buying an Apple microcomputer will benefit from this book. In learning how to program the microcomputer, the author emphasizes flow charting. This technique receives one of the fullest explanations available in any microcomputer book. A fine and useful book for anyone new to the Apple microcomputer.

Porter, Kent. **Computers Made Really Simple**. New York: Thomas Y. Crowell, 1976. 18 p. illus. (photographs)

Computers in today's world, what is a computer, computer talk, process and language, brains, memory, eyes, ears, hands and mouth of the computer, directing an idiot and who's the boss.

Rice, Jean. **My Friend the Computer**. Minneaplis: T.S. Denison & Co., 1976. 85 p. (line drawings are cartoon-like, photographs)

What is a computer?, How are computers used?, History of computers, How does a computer work?, Devices used to get information into and out of a computer, How to plan a computer map (flow chart), How to tell a computer what to do (programming), and an appendix.

Rusch, Richard B. **Computers: Their History and How They Work**. New York: Simon & Schuster, 1969. 126 p. illus. (photographs)

Thinking things through, counting machines, it's really quite simple, input, output, through put, you're the boss, today is history, careers today and tomorrow, with glossary.

Willis, Jerry. **Peanut Butter and Jelly Guide to Computers**. Forest Grove, OR: Dilithium Press, 1978.

Simple and satisfying introduction to computers, very easy for a beginner to understand and gives a firm grasp of the essentials.

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SCRIPT FOR USING THE MICROCOMPUTER IN THE ELEMENTARY SCHOOL

1. Music

2. Music

3. Ruth Sather, a media specialist, has developed and piloted this program for use with elementary students. She is currently a consultant for developing computer software. Dr. Richard R. Buck, a professor in Library Media at University of Wisconsin has graciously assisted with the development of this filmstrip.

4. On behalf of our young computing friends, we would like to welcome you to the world of computers!

5. Computers have proven to be a valuable asset to man and have many advantages over humans. However, computers cannot think! Therefore, you need to know some basic information about how to use the computer, as well as some computer terms. You can even learn to write simple programs with a little practice.

6. Your teacher or media specialist will introduce you to the microcomputer. During various sessions you will learn about...

7. Terminology, special keys and symbols, step by step operation, getting an operator's license and a student computer club.

8. In the next few frames you will be introduced to some of the basic terms you will need to know. The first term is...

9. Video Monitor. The video monitor is a television receiver. Whatever you program into the computer will appear on the screen. Some computers have the video monitor connected to the rest of the computer components.

10. The terminal is a device with a keyboard like a typewriter that processes input and output of data or information. It is important that you know how to use and locate various keys. You will find out more about this later in the filmstrip.

11. The disk drive is part of the computer hardware which feeds information into the main terminal. Without the disk drive, the computer could only be used as a calculator and would not be able to save information for you.

12. The disk, sometimes referred to as "floppy disk" is a record like magnetic-coated piece of material which contains programs or stores information. The disk is permanently sealed in the square black plastic cover which helps protect it, keeps it clean and allows it to spin freely in the disk drive. Never try to open this package!

13. Never let anything touch the brown or gray surface of the disk. Handle it by the black plastic cover only. It is a good habit to hold it by the label.

14. The toggle-switch is a two-position switch which can flip from one position to the other and back again. It is similar to a light switch.

15. It is located on the back of the terminal on the left side. The toggle switch is used to turn the power on to operate the computer. The location of the toggle switch varies from one computer to another.

16. The keyboard on the terminal is a set of labeled keys used to permit entry of information into the computer. It looks like a typewriter, but there are some differences. One main difference is that the computer has only capital letters on it.

17. This is an example of part of a program displayed on the screen. The square which you see is called a "cursor". It will keep blinking until you type in a response or answer. On some computers the cursor may look different.

18. Study sheets are provided that will help you learn these computers terms. You will be tested on these as part of the requirements for obtaining your computer operator's license.

19. In the next several frames you will be introduced to some special keys and symbols. Knowing these will make it much easier to operate the computer.

20. The power light is not a key. It merely lights up when the toggle switch is turned on to let the user know the power is on. It is never pressed. As a matter of fact, it doesn't move!

21. The space bar is the long bar below the keys that is used to give spaces between words or letters. In some programs it is pressed to continue on or to advance information on the video screen.

22. The return key is probably the most important key on the keyboard. After a response or command is typed in, the return key is pressed. In many cases, if you do not do this, the computer will do nothing. The computer is very patient and can wait for a very long time!

23. The back space key which has a left pointing arrow on it, acts as an eraser on the keyboard. If you make a mistake in spelling or typing, you can go back to the error in that line and type over the letters to correct your mistake.

24. CRTL means control. This key can be used in a combination of ways. For example, it can be used to interrupt or stop a program by holding down on CTRL while touching the letter C. You can get the program running again by typing CONT which stands for continue.

25. The oval with a line through it is really a zero. The line is put through it so you do not confuse it with the letter O.

26. The plus sign stands for addition and the minus sign stands for subtraction. Notice that some keys have two symbols or characters.

27. The asterisk, which looks something like a star, stands for multiplication and the slash indicates division. When there are two symbols or characters on the key, if you press the key you will get the bottom symbol. In order to get the top symbol, you will need to hold down on shift, which is a key, at the same time you are pressing the key. This is the same as on a typewriter.

28. Step by step operation will show you the steps you must follow when operating the computer. They are also explained on the second study sheet you will be provided with. These steps are...

29. When using the computer, the first thing you will need to do is to turn on the video monitor. You will not need the volume, as any sounds will come from the computer. Don't worry about the volume control. All sounds generated by the computer are controlled by the computer.

30. Select the disk you would like to use. Remember how you are going to handle it.

31. Next, open the door of the disk drive by gently pushing it back. Do not let the door click up by itself as this can cause the spring to break. Repairs are expensive.

32. Insert the disk into the disk drive. Do not force it in or bend it. Close the door of the disk drive by gently pushing down on it.

33. Turn on the toggle switch...

34. On this computer, it is located on the back of the terminal on the left hand corner. The power light will come on.

35. A red light on the disk drive will go on and a whirring noise will be heard. When the whirring noise stops and the red light goes out, the program is stored in the terminal.

36. After a few seconds, the menu or catalog will appear. The catalog is a listing of programs you can select from. Notice, on this screen, the cursor is merely a short line.

37. The cursor will keep blinking until you have made a choice and touched the return key. The program is now ready for you to use.

38. When you are finished using the computer, follow these steps in correct order! Remove the disk only when the red light is out...

39. and you see the cursor blinking on the screen.

40. Never open the door on the disk drive when the red light is on! This could permanently damage the disk and the disk drive.

41. Put the disk back in the envelope and proper storage space. The disk should be stored in an upright position. They should never be put on top of the video monitor.

42. Turn off the computer by using the toggle switch.

43. Turn off the video monitor.

44. The steps that you will need to follow in order to get a computer operator's license will be explained. Operating a computer can be compared to driving a car. You need to know how to drive and get a license before you can use it. Likewise, you need to know how to operate a computer before you can use it. If you meet the qualifications, you get a computer license. Just like a driver's license it can be revoked if user rules are violated. This is a sample procedure for getting a license.

45. After a demonstration on using the computer, handouts will be provided that deal with terminology and operation. Familiarize yourself with them as you will be quizzed on both areas.

46. The written test is not difficult. It is necessary that you understand the computer terms you will be using. It is most important that you know the steps to follow when operating the computer.

47. After you have passed the written tests, you will work with a licensed student. This student will act as your instructor for a few sessions until you are comfortable in operating the computer by yourself.

48. As a licensed operator, you will have a scheduled time to come to the media center to use the computer. You will also be able to sign up for use before and after school, recess and noon hour.

49. This is what your license will look like.

50. You will be able to select from a wide variety of disks. Some of the disks deal with math, science, language arts, and social studies. Other disks show you how a computer works and how to write simple programs.

51. Computer books will help you learn more about computers, computer careers and computers in society and everyday life.

52. Have your media specialist locate these materials for you.

53. Besides books about computers, there are filmstrips, tapes, activity kits and computer disks that will be helpful. Your teacher or media specialist will introduce them to you.

54. Adults can be and are involved in computer user groups. Students can do the same!

55. If you are a licensed operator, you may have the opportunity to take part in a student computer club in your school.

56. As a computer club member, you may wish to write simple programs. You will need an easy handbook or a copy of the book such as **Computers for Kids**, which will show you how to do this.

57. Members have a chance to design and construct computer related bulletin boards. This example shows a variety of computer articles the students collected.

58. This bulletin board is showing the components of computer hardware.

59. Another benefit of the club allows for the sharing of ideas and original programs the students have written.

60. One responsibility of club members is to act as tutors for primary students and new users. The tutoring also includes getting the computer ready for kindergarten and first graders to use a program.

61. Other activities are provided for the club, such as using various activity books. For example, **Basic Discoveries**, provides the opportunity to solve problems, predict, and investigate other areas of writing computer programs. Another book, **Computing Tutor**, is a booklet containing easy computer lessons, many of which do not require the use of a computer.

62. Being a computer club member is fun, informative and will give you a chance to be well on the road to compete in this computerized society!

63. In this presentation, you have been introduced to the microcomputer and some of the basic information you will need to know to use this exciting machine successfully.

64. Using ready made programs is only the beginning! Writing programs is really childrens play. Who knows? Someday, you may be a computer expert in this world of high technology!

65. Music (END)

TEACHING GUIDE
Computers in the Elementary School

Purpose: This sound filmstrip is designed to introduce students and teachers to the microcomputer. It shows the actual setting of where and how students are using the computer in the school media center. Five topics are discussed in detail: computer terminology, special keys and symbols, step by step operation, getting an operator's license and a student computer club.

Level: Grade three and up.

Length of S/F.S.: 13 minutes

Suggestions for using this S/F.S.: If this is the first introduction students have had with the microcomputer, it is recommended that you stop at various places during the filmstrip and discuss the information with the students. In the accompanying script, indication is made at where review sessions would be advisable. The study sheets and tests referred to in the filmstrip are included in the **Implementing and Utilizing the Microcomputer in the Elementary School Manual.** The tests are also a part of the **Student Computer Activity Handbook.**

Script: *(in entirety) to be included here.*

Review questions: to be used during and after viewing the filmstrip.

Questions for frames 1-27:

1. What part of the computer hardware feeds information into the main terminal? **(Disk Drive)**
2. What term is used when talking about the television receiver? **(Video Monitor)**
3. The software that contains programs or stores information is the **(Disk)**
4. Describe how you should handle the disk. **(By the label, be careful not to touch the area by the brown or gray oval and the area around the circle).**
5. What is used to turn the power on to operate the computer? **(Toggle Switch)**
6. The hardware that processes input and output of data is the **(Terminal)**
7. What is the keyboard similar to? **(Typewriter)**
8. The blinking square that appears on the screen is called the **(Cursor)**

   What is it telling you to do? **(Type an answer or a response).**
9. What is the power light for? **(To let you know the computer is on).**
10. How is the space bar used? **(Give space between words, letters or characters, continue on or advance information on the screen).**

11. What is the most important key on the keyboard? **(Return)**

12. How do you correct a typing or spelling mistake? **(Use the key which has a left pointing arrow on it).**

13. How is the zero marked so it is not confused with the letter O? **(0, slash through it).**

14. What are the symbols for multiplication and division? **(*asterisk for multiplication / slash for division — Some keys have two symbols).**

15. How do you get the top symbol to appear on the screen? **(Use shift key like on a typewriter. Hold down on shift while pressing the key).**

16. What is one use of the CRTL key? **(To stop a program from running, you hold down on CRTL and touch C).**

17. How do you get the program to start running again? **(Type CONT, which stands for continue).**

QUESTIONS FOR FRAMES 28-43

1. In using the computer, what do you turn on first? **(Video Monitor).**

2. Do you insert the disk first or turn on the computer? **(Insert Disk).**

3. What is the catalog or menu? **(A listing of programs).**

4. What steps do you follow when you are through using the computer? **(A. Remove the disk when the red light is out on the disk drive and you see the cursor blinking on the screen. B. Put the disk away. C. Turn off the computer. D. Turn off the Video Monitor).**

SUGGESTIONS FOR FRAMES 44-53

If you intend to follow a plan similar to the one discussed in the filmstrip, you may wish to take this time to establish the procedures with the students. Have available various computer books and kits for the students to become acquainted with.

SUGGESTIONS FOR FRAMES 54-64

Discuss the possibilities of organizing a student computer club. See the Implementation Manual for more ideas on establishing such a club.

OTHER ACTIVITIES

To help the students become more familiar with the keyboard, bring a typewriter into the media center and have it available for the students to practice on. **Typing Fun**, which is listed in the bibliography of the manual, is a good lead up to this. Keyboard worksheets are also available in the **Student Activity Handbook**.

ABOUT THE AUTHOR

The developer and author of "Computer Literacy System," Ruth Sather, has had experience as an elementary classroom teacher, elementary media specialist and is currently a computer software developer consultant.

She has been a leader in establishing computer science in the elementary school system and has led seminars, presentations and teacher inservices throughout the nation.

She is an active member and serves on the board of directors for the Wisconsin Educational Media Association. She is also an active member of the Association of Educational Communication and Technology and the Wisconsin Library Association. Ruth has published several articles in state and national journals. She has also written reviews for numerous computer books and software; e.g. "Computer Teacher," "School Librarians' Workshop," etc.

ABOUT THE PUBLISHER

National Business Institute is an organization devoted to developing high quality educational programs for teaching professionals. In addition to instructional kits and manuals, we also offer seminars and inservice programs for small or large groups. Please write or call us for details. Everything we become involved with is satisfaction guaranteed.

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All orders are shipped on 15 day approval. If this program does not satisfy your specific needs, you may return it for a prompt refund.

ELEMENTARY COMPUTER LITERACY

Elementary Computer Literacy System is a comprehensive, complete implementation and utilization plan. It is a four part program consisting of ....

1. **Elementary Curriculum Guide** - This detailed guide is complete with specific learning activities outlined to meet the instructional objectives.

2. **Implementing and Utilizing the Microcomputer in the Elementary School** Procedures are outlined with study sheets, tests and licensing process for training and scheduling students to operate the computer. A detailed illustrated manual is included for teacher and student use. A section on software selection includes criteria, evaluation forms and selected sources. Guidelines are provided for organizing a student computer club and special projects. Bibliographies of computer books for students and teachers are included.

3. **Computers in the Elementary School** - A sound filmstrip which can be used to introduce the students and teachers to the computer. Shows actual setting of where and how students are using the computer.

4. **Student Activity Handbook** - A workbook of ideas and activities to use in correlation with the curriculum guide. Additional handouts are available for classroom use.

This computer literacy system has been developed, written and tested by one of the most qualified and read experts in the field, Ruth Sather. "Computer Literacy System" is the first and only practical and comprehensive computer awareness/teaching program available to the elementary school.

This system will help you not only initiate a computer program if you don't currently have one, but can also improve an existing program significantly at a nominal cost. Experts who have successfully field tested this system have found it to be a vital tool in the development of new and the improvement of existing curriculum.

Elementary Computer Literacy System provides all the essentials for your school to easily and efficiently implement computer technology in the existing curriculum. This systemized computer literacy program is comprehensive and complete with concise objectives, activities and advancement procedures. This is a practical, "hands on," easy to follow plan that will help you and your students....

-develop a positive attitude toward computers
-become familiar with computer terminology
-exhibit proper care of computer hardware and software
-use the computer as a learning tool to reinforce or teach concepts from various subject areas
-use the computer to solve problems
-become aware of the impact of the computer in society and everyday life

ORDER FORM
Elementary Computer Literacy System

____ Please send us ____ "Elementary Computer Literacy System" packages @ $110 each.

____ Please send us ____ additional student activity handbooks @ $5.95 each plus $1.50 shipping costs. We pay shipping costs on orders of 10 or more.

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All orders are shipped on 15 day approval. Satisfaction is guaranteed.

Suggestions for Using Student Activity Pages

P. 2) Generate a discussion with students as to what their conception of a computer is. Some may depict them as robot like associated with science fiction. After story selections or assigned readings about computers, the students should be able to visualize their concept at a computer. When they hear the word computer, they should draw the mental picture they get.

P. 3) As a follow up to page 1, the student can go one step further and visualize what goes on inside the computer and draw what they foresee the inside of a computer looks like. It is suggested that the students do their drawings first and then actually get a peek inside the terminal (easily done with some computers). However, warn them that they are never to open the terminal on their own. Many schools have a lock system mounted so the student cannot open the lid or cover.

P. 4-5) Discuss with the students the many machines available that supplement and extend people's physical capabilities. Talk about cars, airplanes, telephones, televisions etc. Remind them that the computer is a brain extender and can supplement and extend human physical capabilities in many ways. Provide examples. Let them then explore other machines that are brain extenders to complete the activity.

P. 6) Provide the student with some general computer information by reading aloud selections from books or assigning special articles. Have the students use some in poetic form. Provide one or two examples for them along with some words they might want to incorporate into the poem. This could correlate well with the language arts program.

P. 7) Provide a list of computer words that the students have been exposed to through various readings and discussions. Encourage them to write a computer story. The activity is open ended, as they can either start a sentence with the letter from the computer located in the square or incorporate the letter with a word.

P. 8) This activity illustrates the basic computer components that can be reproduced with the opaque projector or transparency method to develop bulletin boards, charts etc. to reinforce or introduce the terminology connected with the description of the hardware.

P. 9) The student, after having been exposed to what a computer can do, should be able to complete this activity sheet independently. This would be a good checklist to see if the student is able to recognize the capabilities of the computer.

P. 10) As a follow up to page 8 the student would need to determine advantages and disadvantages of the computer. This could lead into a good panel discussion or debate session. A good activity to use in the Language Arts area.

P. 11) This page is used as a review for Section I, "What is a Computer?"

P. 13 & 14) The suggested list of computer terms can be used to create a computer adventure. Students do not necessarily need to know the exact usage of each term to write the adventure. The idea is to become familiar with the terms and see how they can visualize them in relation to the computer. Consider having a contest to see who can use the most words in their story or adventure.

P. 15 & 16) Computer term word search was produced with a teacher utility disk. Page 15 is an easier version and page 16 is a harder version.

Page 17) Computer crossword was produced with a teacher utility disk. This will help students to become more familiar with computer terms.

P. 18 & 19) Computer match game is intended as a two level quiz on general terms associated with computer literacy.

P. 20) Computer vocabulary quiz provides another means of identifying terms relevant to the computer.

P. 21) This activity gives the student experience in identifying hardware and software. This should be taught in relation to other forms of media. i.e., 16mm projector and 16mm film — filmstrip projector and filmstrip cassette recorder and cassette tape.

P. 22) Students need to be aware of the parts of a computer system. During this exercise, having had visual presentation and discussion, the students should be able to either write words in appropriate boxes or do cut and paste. See activities in curriculum guide.

P. 23) Input — Process — Output exercises provides experience for the student to identify each of the activities as I, P, or O. This is based on prior lessons in correlation with the curriculum guide.

P. 24) After students have had an introduction to examples of RAM (Random Access Memory) and ROM (Read Only Memory) they should be able to distinguish between characteristics of each. They would need to understand that ROM would include what a computer manufacturer could do and that RAM would include what a programmer might be able to do.

P. 25-26) Computer keyboard activities allow the student to become familiar with the keyboard. Simple directions such as locating their name on the keys will help them understand that key location is for finger coordination, not alphabetical order. Bringing a typewriter to the classroom and having students practice typing simple examples etc., would greatly improve this skill. **Typing Fun** by learning works (see bibliography) would be a useful tool.

P. 27-28) These pages provide information that the student needs to know for specific functions of the computer. This may need to be adapted to your particular computer.

P. 29-30) Computer flashcards can be duplicated for practice in recognizing symbols and keys on the terminal. These can be reproduced for charts, cards — these may need to be adapted for a particular model of computer.

P. 31-32) True or false review provides checklist for student comprehension of how computers work. Computer operation may need to be adapted for a particular model of computer.

P. 34) Discuss with your students what rules and precautions you expect them to follow when using the computer. As a follow up, have them construct a "Bill of Rules" in using the computer.

P. 35) A sample computer operator's license is provided. This can be issued to the student, similar to a driver's license. The computer certificate will be your record of the student having met the requirements. This can be displayed on a bulletin board or filed under "licensed operators." Remind students that a license can be revoked if they violate the established rules.

P. 36) As a checklist for student interaction, this form gives an opportunity for individuals to identify specific kinds of programs they have used. As a result, they should be able to distinguish between drill and practice, simulation, tutorial and writing sample programs of their own.

P. 38) This activity introduces the student to some different computer languages. Encourage them to use various references to locate their information. Have a sharing session to allow them to compare their findings with others.

P. 39) This is an introduction to what a listed computer program looks like. Demonstrate writing a simple program for them. List and run it. If computers are available encourage them to try typing in and running the sample programs. They may want to modify the numbers or names used to fit their situation.

P. 40) Programming commands, NEW, LET, PRINT, END and RUN are explained. It should be pointed out that the line numbers tell the computer the correct order it should process the instructions. Explain why 10, 20, 30, etc. are used rather than 1, 2, 3, 4, etc. Show how new lines can be added and the computer will automatically put them in the proper place.

P. 41) Explain to the students that a flow chart is a collection of boxes connected by arrows and it is designed to give a set of directions. Different shapes of the boxes have different meanings. The student should become familiar with the shapes and how they are used.

P. 42) The sample flowchart allows the students to look at the logical set of steps they might follow in getting to school and returning home. The class may suggest other activities or jobs and develop a flow chart together.

P. 43) The student should be able to go through this activity independently after having covered activities on pages 41 and 42. It may be desirable to write the information rather than cut and paste.

P. 44) This activity gives the student another experience in putting steps in the correct order on a flow chart. The new concept of using the decision symbol is added.

P. 45) Students should be expected to go through a training session before they operate the computer on their own. Have them list the steps they follow in their school and then let them develop a flow chart to show the set of steps.

P. 46) The print statement is introduced. (immediate mode). Go through several samples with the students and have them complete the activity independently. They are reminded that the * and / stand for multiplication and division.

P. 47) The print statement is extended to use quotation marks. The student should be aware that when expressions are placed inside quotation marks the computer will print them exactly as they were typed in. Have the student complete the activity independently. Encourage them to try it on the computer.

P. 48) Discuss the flow chart and problem with the students. Let the students decide if the steps in the flow chart will solve the problem. Have the students then write in the print statements and compare answers to see if they are in agreement. Either as a class or individually, try their program on the computer to see if it works.

P. 49) This page is used as an evaluation tool to see if the students have met the objectives for writing a simple program.

P. 51) Generate a discussion with the students as to where and how computers are used in their community. Try to use examples not listed on the activity sheet. Possible ideas could be drugstore, soft drink machines, electric company, water company, service stations etc. Have the students then complete the activity sheet and discuss their answers and see if classmates agree or disagree.

P. 52) This activity will not need a greal deal of introduction. Encourage the students to invent new ways to use the computer in the home that may not be yet discovered. They should try to include many ways one computer could be used by their family. These would make an excellent bulletin board display.

P. 53) This activity is an extension of p. 52. This would correlate well with a language arts activity.

P. 54) This lesson is designed for the student as a research assignment. Provide a variety of reference books as possible resources. This would provide for a good classroom discussion to see the various uses they are able to identify.

P. 55) Make students aware of the many careers that have some form of computer function. A good follow up to the lesson could have the student select a career and trace down the training necessary and to what degree computer knowledge would be required.

P. 56) Have the student contact a person who has an occupation where he/she is involved with using computers. The student should prepare a set of questions they want to ask, make an appointment and have an interview with the person. Report back to the class on their findings.

P. 58) In tracing the historical development of computers the student needs to do research to complete the time line. Encourage them to use a variety of resources, as well as encyclopedias. This would also be an excellent idea to use for a bulletin board.

P. 59) This completion activity acts as a review or a further research lesson dealing with computer history.

ANSWER KEY

Page 9

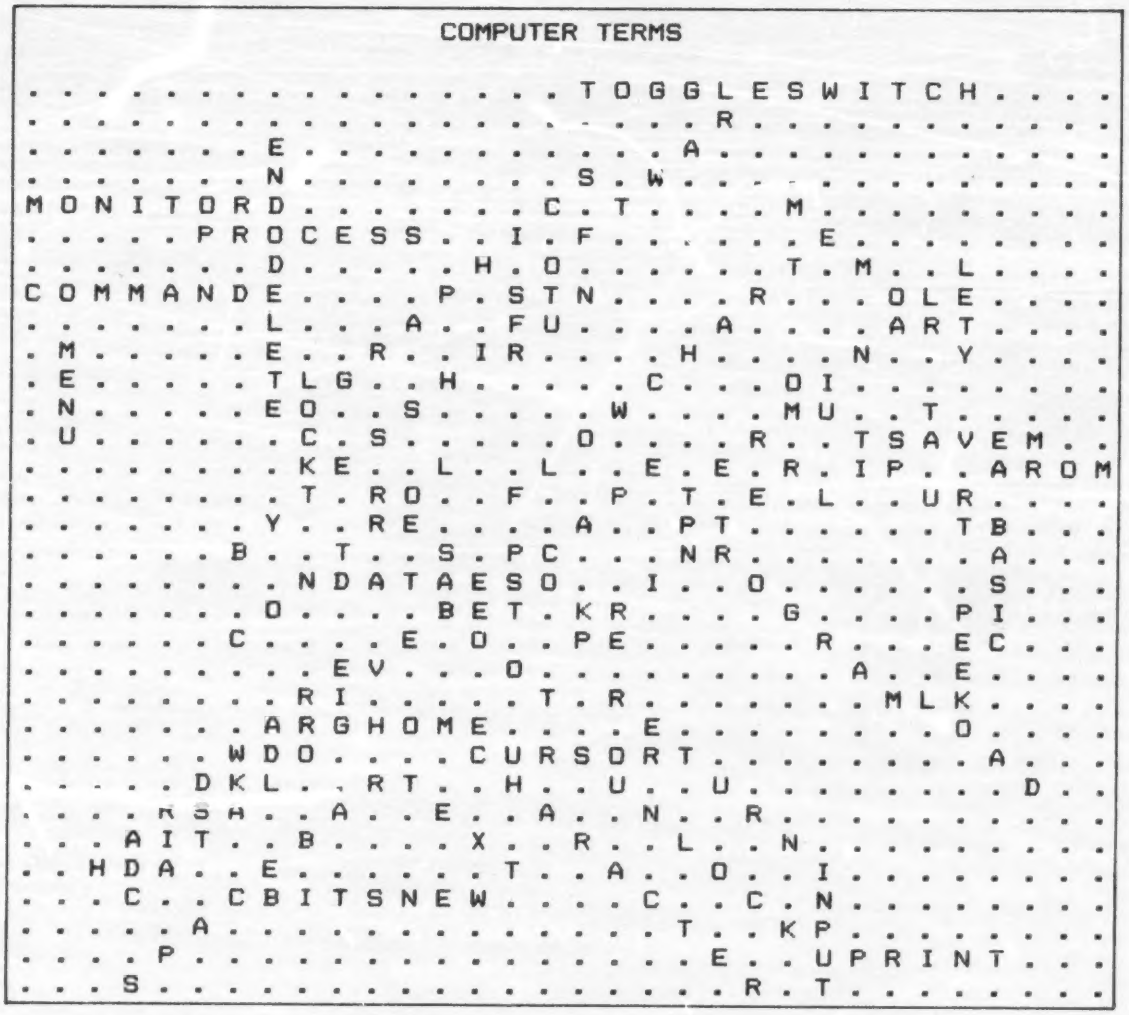
	Can	Cannot
1.	●	○
2.	○	●
3.	○	●
4.	●	○
5.	○	●
6.	●	○
7.	●	○
8.	○	●
9.	●	○
10.	●	○

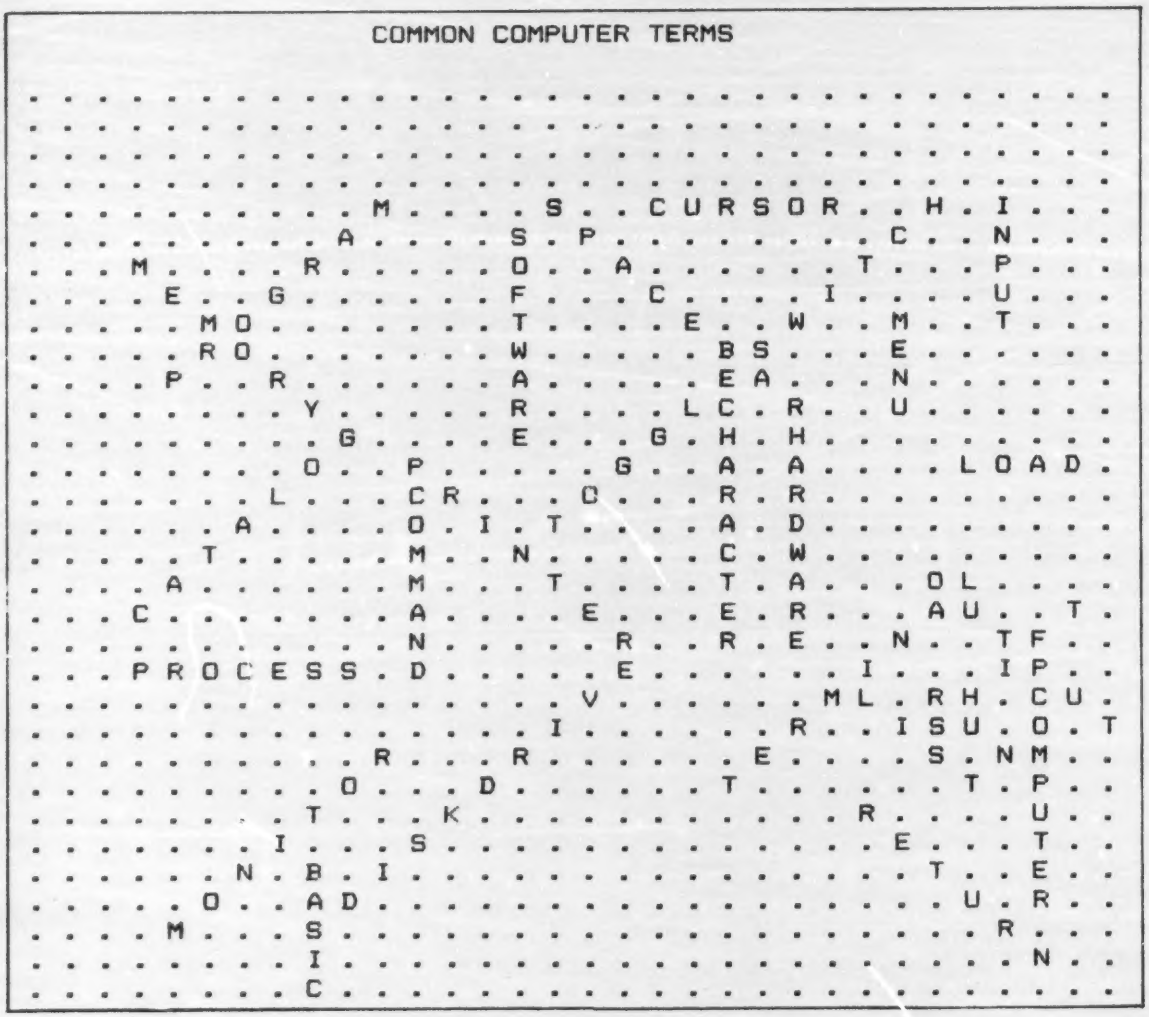
Page 10

	Advantage	Disadvantage
1.	●	○
2.	○	●
3.	●	○
4.	●	○
5.	○	●
6.	●	○
7.	○	●
8.	○	●
9.	●	○
10.	○	●

Page 11

1. A	5. C
2. B	6. A
3. A	7. B
4. C	8. C


COMPUTER TERMS


COMMON COMPUTER TERMS

Page 16

```
THE ANSWERS
-----------

ACROSS
------

[ 8 , 1 ]   TOGGLESWITCH
[ 8 , 16 ]  FLOWCHART
[ 10 , 11 ] TERMINAL
[ 15 , 12 ] PROGRAM
[ 18 , 18 ] OUTPUT
[ 19 , 11 ] SPACEBAR

DOWN
----

[ 1 , 6 ]   HARDWARE
[ 4 , 24 ]  INPUT
[ 6 , 22 ]  CHARACTER
[ 8 , 11 ]  CATALOG
[ 8 , 17 ]  LOAD
[ 8 , 20 ]  COMMAND
[ 9 , 13 ]  PRINTER
[ 9 , 15 ]  DISK
[ 15 , 16 ] RUN
[ 15 , 18 ] MEMORY
[ 15 , 23 ] SOFTWARE
[ 16 , 11 ] CURSOR
[ 19 , 14 ] COMPUTER
[ 19 , 16 ] BOOT
```

Page 18

1. 13	7. 2
2. 7	8. 4
3. 5	9. 1
4. 8	10. 11
5. 3	11. 6
6. 12	12. 10
	13. 9

Page 19

1. 4	8. 16	15. 10
2. 7	9. 20	16. 5
3. 2	10. 14	17. 15
4. 1	11. 11	18. 19
5. 9	12. 8	19. 18
6. 17	13. 6	20. 13
7. 12	14. 3	

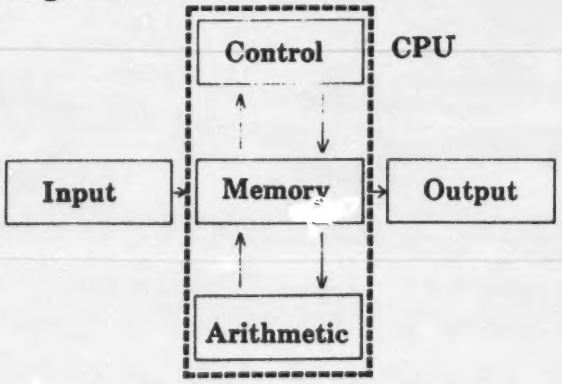
Page 20

1. Cursor
2. Return
3. Toggle switch
4. Monitor
5. Power light
6. Program
7. ←
8. Command
9. Terminal
10. Disk
11. Hardware
12. Disk drive
13. Space bar
14. Menu or catalog

Page 21

1. hardware	5. hardware
2. software	6. hardware
3. software	7. hardware
4. hardware	

Page 22



Page 23

1. O	6. I
2. P	7. O
3. I	8. I
4. I	9. O
5. P	10. P

Page 24

RAM	ROM
1. X	1. X
2.	2.
3. X	3.
4. X	4. X
5.	5.

Page 31

1. true	7. false
2. true	8. false
3. false	9. false
4. false	10. false
5. true	11. true
6. true	12. true

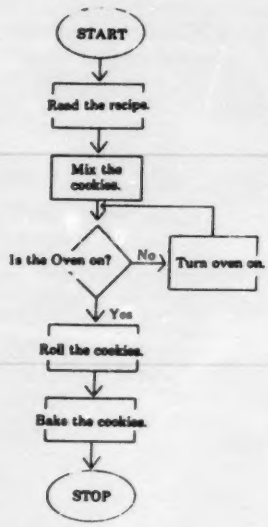
Page 32

1. return
2. monitor
3. A
4. by label
5. program is ready
6. no
6. power on no
7. cursor appears
8. use shift
9. disk out computer off monitor off.
10. help

Page 43

1. Start
2. Select a book
3. Sign your name
4. Get date due card
5. Read the book
6. Return the book
7. Stop

Page 44



Page 46

1. 8
2. 8
3. 9
4. 3

Page 47

1. 6+6 = 12
2. 10/2 = 5
3. Hello
4. My name is Betty
5. Today is Tuesday
6. 12
7. Goodbye

Page 48

```
new
10 Print 5 * 1
20 Print 5 * 2
30 Print 5 * 3
40 Print 5 * 4
50 End
```

Page 49

```
    New
1.  10 Print 6+5+10
    20 Print 17 - 12
    30 End

2.  Answers will vary.
```

Page 55

1. 4	6. 2
2. 10	7. 8
3. 6	8. 8
4. 1	9. 9
5. 7	10. 5

3000 B.C.	Abacus - counting device used by ancient Chinese and Egyptians.
1642	Pascal - invents first mechanical calculating machine.
1830	Charles Babbage - designed a machine called the analytical engine.
1888	Herman Hollerith - takes the U.S. census using a punched card tabulating machine.
1930	Vannevar Bush - builds the first analog computer.
1944	Mark I - first digital computer, invented by Professor Aiken from Harvard University.
1946	The first all-electronic computer built, the Enivac, at University of Pennsylvania.
1951	Univac I was built using vacuum tubes. It was the first mass-produced and commercially available computer.
1960	Second generation of computers developed. These used transistors instead of vacuum tubes.
1965	Integrated circuits developed - third generation of computers.
1970's	Miniaturization of integrated circuits. These lead to the development of the chip and micro-processors.
1982	Widespread use of microcomputers in homes, schools, business and industry.
2000	(Student can speculate on this)

Page 59

Missing Words in the Following Order:

univac, vacuum tubes, large, faster, transistors, integrated circuits, million, smaller, chip, micro miniaturization, and faster.

GLOSSARY

BASIC—An easy computer language used by beginners.
BITS—Storage cells in a computer's memory.
BOOT THE SYSTEM—Turning the computer on; getting it ready to accept disks.
BYTES—A group of bits. The computer usually deals with groups of eight bits.
CATALOG OR MENU—A list of programs on a disk.
CHARACTER—A number or symbol to be typed.
COMMAND—A direction you give the computer.
COMPUTER—An electronic machine that processes information.
CONTROL C—A command to interrupt a program.
CURSOR—A blinking square which appears on the screen that tells you the computer is waiting for a response.
DATA—Information a computer needs to solve a problem.
DELETE—A command to erase a program from the disk.
DISK DRIVE—Part of the computer which feeds information into the main terminal.
END—The last statement in your computer program.
ESCAPE—A key which can be used to get out of a program.
FLOPPY DISK—Record like magnetic coated piece of material which contains programs or information.
FLOW CHART—A map or drawing telling the steps needed to solve a problem.
GRAPHICS—Creates pictures on the screen.
HARDWARE—The complete machinery needed in a computer set up.
HOME—A command to clear the screen.
IF THEN—A branching statement used in computer programming.
INPUT—Information fed into the computer.
LET—A command that assigns a number to a memory space.
LIST—The program statements listed in order.
LOAD—Loads a program from a cassette tape into the computer's memory.

LOCK—A command used to prevent a program from being erased from the disk.
MEMORY—A device within the computer capable of storing information.
MONITOR—Screen where information is displayed. Similar to a TV screen.
NEW—A command to let the computer know you are starting a new program.
OUTPUT—The answer to a problem that the computer gives you.
PEEK & POKE—Advanced computer commands used by professional programmers.
PRINT—An instruction to the computer which tells it to type out a certain thing.
PRINTER—Machine used to print the output from the computer.
PROCESS—How the computer handles information.
PROGRAM—A set of instructions telling a computer what to do.
RAM and ROM—Types of computer memory.
RAM—Random access memory.
ROM—Read only memory.
RESET—The key that takes you back to the beginning of the program.
RETURN—What you must press every time you type something in the computer. The most important key on the keyboard.
RUN—A command telling the computer to execute a program.
SAVE—Records your program on a disk or tape.
SHIFT—A key used to get the upper key on the keyboard.
SOFTWARE—The disks or cassettes containing programs that are used in the computer.
SPACE BAR—Long bar on the keyboard which is usually used to give spaces between characters or to continue on in a program.
TERMINAL—The device with a keyboard like a typewriter that processes information.
TEXT—Reserves the entire monitor screen for printing letters or numbers.
TOGGLE SWITCH—Switch to turn power on or off on the terminal.
UNLOCK—A command used that allows a program to be changed or erased.

ELEMENTARY COMPUTER LITERACY SYSTEM

Part A- Curriculum Guide

I- Introduction
II- Content Areas
III- Scope and Sequence
IV- Instructional Objectives and Activities
V- Bibliography for use with guide

Part B- Implementing and utilizing the computer

VI- Procedure for learning about computer operation
- -Steps in training and scheduling students
- -Teacher survey (where to implement into existing curriculum)
- -Study sheet and tests (to meet requirements for licensing process)
- -Teacher inservice

VII- Computer Manual (Illustrated)
VIII- Software Selection
- -Suggested Criteria
- -Sample Evaluation Form
- -Selected Sources

IX- Organizing a Student Computer Club and Special Projects
X- Bibliographies
- -Student
- -Teacher

Part C- Filmstrip/Tape on Computer in the Elementary School

Part D- Student Activity Book

-Workbook of ideas and activities to use in correlation with curriculum guide